Vol. 16, No. 3 March 1997

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Monitoring Times®

Your Personal Communications Source

Printed in the United States

The Fun Is Back!

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You won't miss a thing with Reaction Tune. The ***Scout's*** CI-V compatible output allows it to interface to the AOR AR2700/AR8000, ICOM R7000, R7100, R8500, R9000 and now the new IC-R10 (shown oposite). The ***Scout*** captures the frequency, then sends the serial data to the receiver and tunes the scanner to the frequency for instant monitoring in less than one second. Recorded frequencies can be downloaded to a PC using the optional OptoLinx universal interface •

SPECIFICATIONS

- 10MHz - 1.4GHz frequency coverage
- Stores and records 400 frequencies in memory with 255 hits for each
- Interface to a PC for frequency download using optional OptoLinx PC interface
- Distinctive beeps indicate frequency hits, pager style vibrator for discreet recording
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- 16 segment RF signal strength bargraph
- Frequencies are automatically saved when unit is turned off
- Reaction Tune the ICOM R7000, R7100, R8500, R9000, IC-R10, and AOR AR2700, AR8000, and the Radio Shack Pro 2005/6 using the Optoelectronics OS456, Radio Shack Pro 2035/42 using the Optoelectronics OS535

Scout with ICOM IC-R10
Mono Cable required (shown)

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Monitoring Times™

Vol. 16, No. 3 March 1997

CONTENTS

Cover Story

Uniden Parades the TrunkTracker

Monitoring Times is proud to present an exclusive and comprehensive feature on the ground-breaking Uniden TrunkTracker scanners. Though the radios were just unveiled at January's Consumer Electronics Show, this article includes some significant software upgrades made since that release.

Designed to follow Motorola analog trunked systems, the scanners can track communications by agency in a number of ways. It's all spelled out for you in *Monitoring Times*, beginning on page 8.

The trunked radio in our cover photo is typical of the systems which will once again be open to the news media, scanner hobbyists, and off-duty personnel or their spouses who want to keep up with the action. Our thanks to the City of Miami Police Department and to photographer Robert Wyman.

Reviews:

The ICOM IC-R10 general coverage handheld scanner is in the country, and due on the shelves at any time. Bob Parnass looks at it with a discriminating eye and finds it a mixed bag of advanced technology, flexibility, and limitations. See his write-up on page 94.

There are some real advantages to digital tuning over analog, but in general a digital radio means increased expense. One rather obscure shortwave radio called the Electro Brand SW-3000 has broken that price barrier, coming in at $40-$70—if you can find one. See Magne Tests on page 92.

DEPARTMENTS

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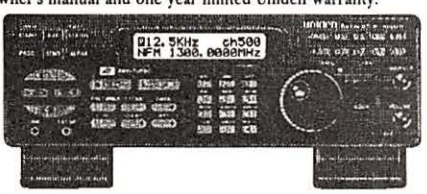
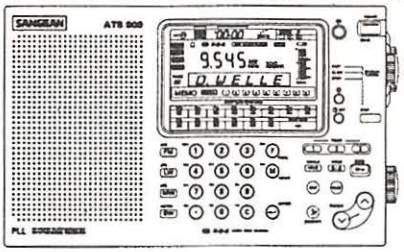


Shortwave Radio



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Bearcat 80XLT-A handheld with 800 MHz.	$129.95
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VR2408MM24 24 channel single 8 mm. drive, 875+ channel hours	$19,985.95
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Getting Started

One reader of Skip Arey's "Beginner's Corner" was inspired by his September '96 column on rediscovering the fun of just tuning around. He wrote, "To make a long story short, after I got home from work, I told my 6 year old that we were going to visit some far away places, but not on the internet. I broke out my Realistic PRO-34 scanner and my Realistic DX-440 (that took me home each night while I was away in Desert Storm), and cranked them up.

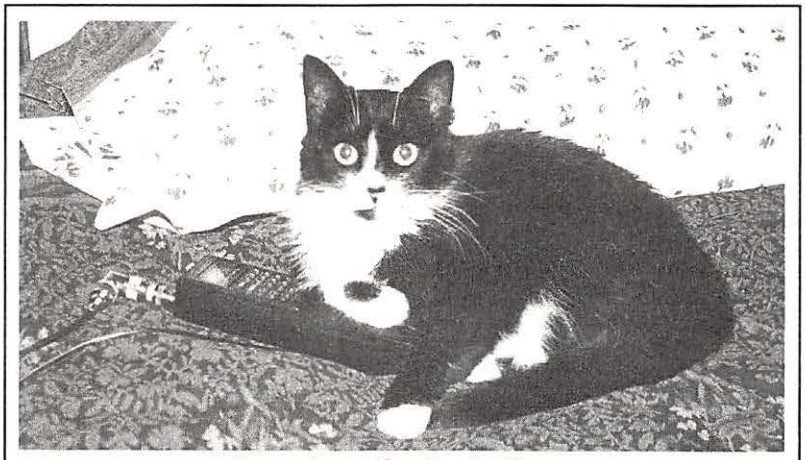
"The first thing we heard was an AM station in Chicago. (We live in the Dallas/Ft. Worth area, so I kinda figured this would be easy to get.) I showed him on the map and he was hooked.

"Throughout the night we roamed around the world to such places as Quito, Ecuador, BBC in England, Germany, Austria, and finished off in Japan. He was a little hard to wake up this morning, but the first thing he asked me this morning was if we could surf the world tonight when I get home from work.

"Now we have to go get some IRCs and start collecting some cards...that should really get him fired up when he sees the first one come in. Now toy trains are out and he wants a new antenna for Christmas. Thanks for reintroducing me and helping me show my son another way to travel!"

Skip Arey says, "There's nothing I enjoy more than hearing about how radio brings a parent and child together. A neat school project is to collect QSLs and place them around a world map with strings to show the countries they come from. Maybe you and your son can get other kids and their parents interested this way. I am happy that you and your son have found a way to share the world together. These times will be lasting memories for both of you."

In this March issue, Skip and his own Number Two son turn the TV off and explore the world of electricity together.



Scanning: The Cat's Meow

An MT reader from Appleton, Wisconsin, tells us that his "scanner cat," Casey, has a warm and fuzzy feline, er, feeling, for her Bearcat scanner (no relation). Could she be the most devoted scannist in the cat family? Or does she just enjoy the heat that the Ni-Cd battery produces during charging? Purrr-ty tough to say, all in all.

Don't Be Afraid to Try

This reader's no longer a kid, but he still gets excited about making new discoveries. John Hall of Swannanoa, North Carolina, writes, "I want to thank everyone involved at *MT* for a great magazine. I have been scanning for about ten years, as a hobby. I had the average Bearcat 100XL scanner, then went to a Radio Shack Pro 26 and thought I had something. Then one day I signed up on the internet and found Grove.net, saw an AR8000 scanner, and had to have one.

"I drove from Swannanoa to Brasstown, about 100 miles one way, and met the nice people at Grove. Returning home with my newfound toy and feeling like a kid a Christmas, I started listening to all of those sounds and wanting to know more. They had given me a copy of *Monitoring Times* and it was full of information on what those sounds could be, like WEFAX, RTTY, AMTOR and others.

"Boy, now I was interested in how to see the weather off the airwaves! I searched the net, bought other radio magazines, and found lots of high dollar wefax packages. Then ordered the Baycom BP2M, which supposedly works great at under $70 dollars. When it arrived, I installed the software that came with it, JVFAX and HamCom—two great programs.

"Well, it took me two months to get the thing to work; it didn't tell me all the settings I needed like which IOC, LPM, Deviation and so on. Then I got the August issue of *MT*, read the article on "HF Fax on a Shoestring," tried the settings given there, started down the frequency list and finally, a FAX! The BP2M worked—all I had to do was find a good strong clean signal and it would work. (Just try to find a good clean signal with a scanner, AM mode, 70 feet of coax, and a ground plane scanner antenna!) The pictures were good but grainy.

I read the article again, looked over the demodulator diagram, and decided to try to build one. I knew something about electronics, but had never built anything. I went to Radio Shack with *MT* in hand, got the parts, and went to work on it that night. Two hours later it was complete; I installed it and fired up the computer—no smoke, so it must be ok. I started JVFAX and tuned in on a signal. Then here it comes, a fax, a great looking fax; WOW, this thing works great. Even with a weak and noisy signal I could still make out a fax.

"The only explanation I could come up with is that the store-bought one was made to transmit, too, and needed more power than my scanner could produce out the earphone. The demodulator in the *MT* article was for receive only. Well, all of this was to say 'Thanks, *MT*, for a great magazine, I'm going to order a subscription today.' [And to other readers], don't be afraid to try."

Muffled Voices

Paul Spitzer wrote his appreciation for Jim Frimmel's listing a website which provides frequency information for Voice of Russia (**www.vor.ru/worldnew.html**). "I've been listening—or trying to listen—to VOR for a number of months now, and I found it frustrating that I knew of only one frequency. Now if I only had a bigger unit and a powerful antenna!"

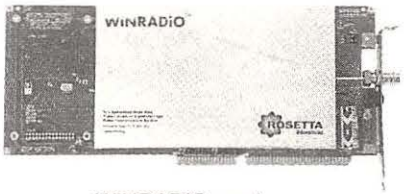
"I listen to VOR and Deutsche Welle nearly every day: I am a free-lance interpreter and translator, and these broadcasts are really an invaluable link for my work, as it is imperative to keep up with current events in Europe, not only for the vocabulary, but for their points of view."

Frimmel had noted the change in VOR's signature music. Paul adds, "As a life-long fan of classical music, I can confirm that the music chosen is Mussorgsky's 'The Great Gate of Kiev.' I heard comments about this change on VOR: The announcer was reading responses from listeners, one of whom complained that the signature had been changed, because, according to that person, 'Kiev has nothing to do with Russia.' (Ha!, I thought,

(Continued on page 102)

WiNRADiO™

The World's Most Surprising Communications Receiver



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A new look in radios.

"The sensitivity seems to be pretty good across the whole range... ...unique and useful monitoring product...worth a serious look." Monitoring Times, October 1996

"...I don't know of any scanner , where I succeeded instantly in successful reception without studying the handbook..." Radio Scanner, August 1996

"Of all the cool PC cards you could stick in your computer, WiNRADiO takes the cake." internet.au, June 1996

"...high quality workmanship, good reception and easy usage." Chip, November 1996

"...a must-have for hackers. A scanner user's dream." Radio & Communications, May 1996

"The most innovative new product we saw at Dayton HamVention..." W5YI Report, June 1996

WiNRADiO software.
Virtual front panel on your PC.

"WiNRADiO has enticing possibilities...The manual is an exciting book not only because of its beautiful cover, high quality paper, and easy instructions, but also because it contains a mix of operating and technical information about various aspects of radio you might have forgotten or never knew." World Scanner Report, Volume 6, No. 7

Frequently Asked Questions

What are the advantages of having a PC-based receiver compared to a stand-alone one?

1. Communications receivers are similar to test instruments - the trend is towards PC-based instrumentation which allows many front-panel functions to be more flexible and informative compared to a traditional, dedicated control panel.

2. The PC-based software controls all the ancillary functions such as scanning parameters, memories, logging and various operation modes. Compared to hardware or ROM-based firmware control, this gives the receiver greater flexibility, a greater number and sophistication of ancillary functions, practically unlimited memory capacity, and the ability to customize the receiver for special applications.

3. Without the constraints of a fixed control panel, a receiver can have different "personalities" depending on the user's applications and preferences. New functions, for example frequency databases, can be easily added and integrated with the receiver.

4. A number of independent WiNRADiO receivers can be controlled by a single PC. This is very useful if you need to monitor a large range of frequencies on a continuous basis, or where various methods of multi-channel transmissions are employed.

5. A PC-based receiver allows the user to take advantage of the digital signal processing capabilities of the PC. Modern PCs are fast enough to do such signal processing, decoding and display in real time, as well as provide mass storage for received signals.

How can a PC-based receiver cope with PC-generated electromagnetic interference?

WiNRADiO is very well shielded. We use specially developed shielding materials, and innovative design methods to prevent any interference directly entering the receiver. After all, every modern scanning receiver is controlled by an in-built microcomputer; we have simply reversed the roles, and put a shielded receiver inside the computer.

Specifications

- Frequency range: 0.5 to 1300 MHz *(excluding cellular bands)*
- Modes: AM, FM-N, FM-W, SSB
- Sensitivity: 1uV nominal (typ. 0.25uV on FM-N)
- Step size: 500Hz-1MHz (SSB, CW: 5Hz BFO)
- Scanning speed: 50 channels/sec (FM)
- Operating system: Windows 3.1, 95, NT 3.5x, NT 4.0

Dealers

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News

- Windows NT drivers now available
- Contact us for information on specialized surveillance systems
- See us at http://www.winradio.com or http://www.winradio.net.au
- Dealer enquiries invited info@winradio.net.au

The Voice of Money

Money is rolling out of the Voice of America in truckloads. A special judge, gathering evidence from 1,100 women who claim they were unfairly denied employment at the Voice over the last 20 years, is now beginning to award damages. So far, only ten awards have been made, but the amount totals more than $4.5 million. With 1,090 suits yet to settle, some say that awards will eventually cost taxpayers over a half billion dollars. In addition, the government must also establish retirement accounts for the successful claimants and pay their lawyer's fees.

Following are two examples of the successful suits: Lynn Goldman Bartlett and her husband, Robert Goldman, ran a Manhattan recording studio. Both applied for jobs at the VOA in 1980, mailing their applications in the same envelope. He was hired; she was told her application was never received. She applied two years later and was told another form was needed. She learned there was no such form. Bartlett received a check for $562,481.00.

Dilara Hashem, a prolific writer in her native Bangladesh, was hired part-time for the VOA but rejected as a full-timer. After Ms. Hashem was laid off by the Voice in 1975, the agency hired a man full-time who failed his voice test. The man was, according to the Associated Press, retrained, failed a second test, and hired anyway. Hashem's check was for $222,754.00.

San Francisco's Foreign Policy

According to *Dispatch Monthly*, the city of San Francisco has stumbled onto yet another obstacle to awarding a $40 million contract for an 800 MHz trunked radio system for its police, fire, and emergency services agencies—Burma.

Last year, city supervisors passed an ordinance forbidding city contracts with any company engaged in business with Burma, a tiny Asian country under military rule. The only two companies that bid on the job, Motorola and Ericsson, both do business in Burma. Assistant Police Chief Earl Sanders sounded frustrated. "Yes, we obviously have a problem. It's the radio system versus the Burma ordinance. I believe there's a solution out there somewhere. We just don't know what it is yet."

Trouble at LAPD

It may have come down to a single overheated semiconductor. Whatever the cause, the result was that the entire Los Angeles voice police radio system went silent—and remained so for about 90 minutes. Officers in the field could still talk to each other using non-repeated channels, and they could communicate with division stations. Officers and dispatchers could not communicate directly and had to rely exclusively on mobile data terminals. Only Priority 1 incidents could be handled.

According to reports, the chip was located in the microwave system that carries voice communications between the downtown communications center and a transmitter site on Mt. Lee. The MDT system uses a different set of transmitters. The Los Angeles City Council immediately called for a full investigation.

City Councilman Rudy Svorinich said that "Anything which delays response...such as last night's breakdown, potentially poses an unacceptable risk to Angelenos." Mayor Richard Riordan was particularly irked, but more so that his office was not notified of the radio problem. "We're concerned. We did not even get told about the problem."

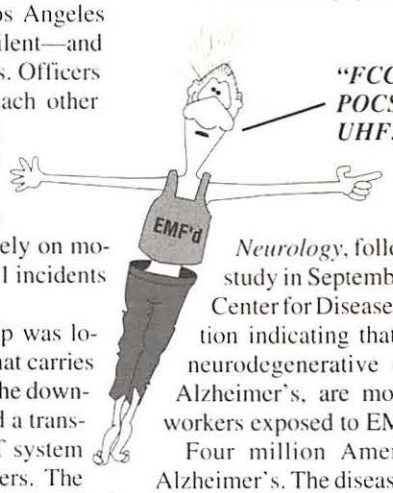
Medical News I

Most new cellular phones will reportedly carry a label warning that they could interfere with a user's pacemaker. While research shows that the potential for such interference is slight—and that most pacemaker makers are now taking steps to shield their products—the Cellular Telecommunications Industry Association (CTIA) decided to move ahead with the labeling plan as a safeguard. The label will warn customers not to hold their cellular phone within 6 inches of a pacemaker, reports say.

Medical News II

Evidence is growing that electromagnetic fields may be linked to Alzheimer's disease, say researchers at the University of Southern California. According to a report, you're more likely to come down with the disease if you work in an occupation where you're exposed to EMF fields.

According to one study, seamstresses, who have their heads down close to the motor of their sewing machines, have, on average, three to five times the chance of coming down with Alzheimer's than the normal risk of contracting the devastating disease. Also at risk are carpenters and others who use electrical powered tools close to their bodies. The results of that study, published in the journal,



Neurology, follows on the heels of a study in September from the National Center for Disease Control and Prevention indicating that a broad variety of neurodegenerative diseases, including Alzheimer's, are more common among workers exposed to EMF on the job.

Four million Americans suffer from Alzheimer's. The disease is characterized by memory loss, disorientation, depression, deterioration of bodily functions... (and an uncontrollable urge to speak in radio acronyms?)

Voting "No" for Sam Morse

Another group has checked in with a vote to chuck Morse. The Radio Amateurs of Canada, Inc., want to end the international Morse code testing requirement in the amateur hobby. The RAC is the national ham radio society in Canada. Admitting that the Morse code issue "touches upon something which, for many, is sacred," the group says that it "cannot...demand that it be kept as a 'mandatory' requirement in the HF licensing procedure. The original need, to be able to respond to government stations in CW, has disappeared...[and its use as a] 'filter mechanism' to exclude those unable or unwilling to learn the code, is discriminatory."

In the U.S., on the other hand, the special committee created by the Amateur Radio Relay League to study issues relating to the 1999 World Radiocommunication Conference (WRC-99) has recommended that the ARRL Board of Directors *not* support changing the requirement to test for Morse code proficiency in order to operate below 30 MHz.

USPS vs. RADIO

The U.S. Postal Service ran the ads in the *Los Angeles Times*, *Wall Street Journal*, and *New York Times*. Designed by the advertising agency Young and Rubicom to get businesses to switch from buying time on radio stations to putting their money into direct

mail, the ads got attention—but perhaps not the type of attention they wanted.

"Her baby's crying. Sure, she's listening to your radio spot," read one ad. Another noted that "when your radio spot is on, only about a quarter of the people are really listening." Still another ad advised that "about half of all advertising on radio goes unnoticed."

Broadcasters, not surprisingly, went nuts. Many felt that the government had turned on them. "Here is a taxpayer-supported bureaucracy that is in competition with private industry...," said Gordon Mason, president of the Southern California Broadcasters Association. Post Office spokesman Frank Brennan's statements to the press seemed to sound like the whole thing was a complete surprise to the USPS.

"We didn't write that (ad)" Brennan defended. Brennan also said that he "didn't have a clue" as to where the figures suggesting radio is 75 percent ineffective came from.

Over the holidays, the USPS began competing with phone companies by selling prepaid phone cards. Said one critic, "What are they going to do next, start selling sandwiches and coffee?"

Basketball Radio

Two blocks from the arena in which the Portland Trail Blazers play, radio station KFXX ("The Fan") put up a billboard. The words "Blazers on The Fan, SportsRadio 1520" appear next to pictures of afternoon drive talk-show hosts Mychal Thompson and Kermit Washington, both former Trail Blazer players. Beneath both of the pictures were the dates on which Thompson and Washington played for the team.

The billboard got the Trail Blazers and KEX-AM, which carries the team's games, hot. KEX General Manager Dave Milner complained that "We pay for an exclusive relationship with the Blazers. KFXX tried to dilute that relationship." Harry Hut, senior vice-president of the Trail Blazers, called the billboard "guerilla-type marketing." Then the lawyers stepped in.

First they demanded that the billboard be taken down. "We wanted to accommodate them," said KFXX general manager Tom Baker, "but...we weren't doing anything that was misleading. We have the dates that (Thompson and Washington) played for the Blazers. Our attorneys felt that was sufficient."

Apparently it was not. The heat continued to grow. At the last minute, KFXX threw a tarpaulin over the word "Blazers." Still not enough. When commuters saw the billboard the following Monday, someone had added the letters "Ex-" in front of "Blazers." Still more changes were dictated.

An odd, cigarette pack-like warning was added: "Warning: Blazer games are not on (KFXX) The Fan." Executives of KEX remain unhappy. "It's almost like going to a friend's house and stealing their money," grumbled GM Milner.

BBC: Bye, Bye, Di?

Everyone has heard of the bumps and grinds that the BBC is going through. But could it all be caused by Princess Di? Here's how the Princess Di conspiracy theory goes, according to none other than *Elle* magazine. Last fall (or was it the fall before?), Princess Diana was embroiled in bitter pre-divorce publicity game that included steamy charges of adultery. Di played the media like a violin, much to the chagrin of the Royal Family, who wished that Di would act more like a Blue Blood and shut up.

When the BBC carried a tell-all interview with Di worldwide, it was all too much for the Queen. In a fit of pique, Her Royal Highness announced that she was granting the rights to her future Christmas addresses to the BBC's domestic rival, ITV. This is no small slight: the Queen's Christmas address is a high formality missed by few Britons either at home or abroad.

What other royal intrigue is going on behind the scenes? Will the Queen have *Waveguide* canceled because of this item in *Monitoring Times*? It's not nice to cross the Queen.

"Communications" can be blamed on Larry Miller with help from *MT* editor Rachel Baughn. Also part of the team this month is our regular anonymous contributor; Harry Baughn, Brasstown, NC; Pablo Guerno, Manchester, NH; Maryanne Kehoe, Atlanta, GA; Mr. *and Mrs.* Kevin John Klein, Kimberly, WI; Edward Muro, Cedarhurt, NJ; Paschal Newman, New York, NY; Glenn Richter, New York, NY; Jorge Rodriguez; Edward Schwartz, Chicago, IL; Richard Sklar, Seattle, WA; Nick Terrence, Huntington, NY; and Larry Ulve, Topeka, KS. We also checked out *Dispatch Monthly, Elle, National Scanning, Radio World, Satelllite Times* and *W5YI Report* from the local library. We thank all for their assistance.

Uniden Parades New "TrunkTracker" Scanners

This is an article we have been waiting to write for over a decade. Ever since the early 1980s, when trunking radio systems were first constructed, public safety monitoring has taken a down turn. While trunking systems have generally been a boon to their users, offering tremendous flexibility with limited spectrum, the news media, off-duty police and fire officers, hobbyists, and others were often left out in the cold. Uniden has changed all of that.

When scanning an analog trunked system in an extremely active urban area such as Dade County, Florida, it's nearly impossible to follow one agency's communications. But no longer! (Photo by Robert Wyman)

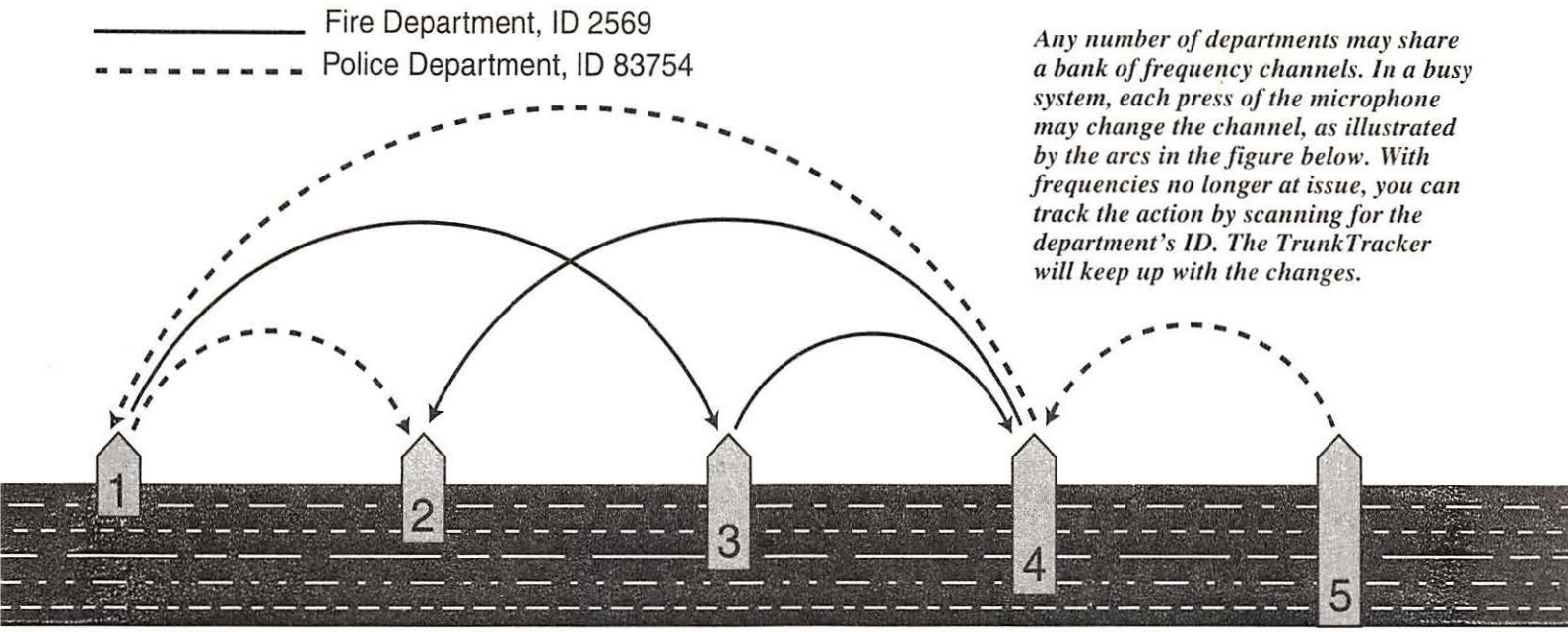
Looking for all the world like a BC-230, the '235 is only given away by the presence of its "track" button. But, what a world of difference!

We won't bore you with a re-hash of how trunking works; suffice it to say that trunked systems, generally comprised of anywhere from three to 29 frequencies and controlled by a single data channel, can provide communications for hundreds of groups of users, from the dog catcher to the fire department arson squad. Conversations on trunked systems often jump frequencies between replies. It becomes very difficult, if not impossible, to follow a conversation, especially on busy urban systems.

Years ago when many of us first began to scan, you knew that your local police operated on 460.500 MHz, your local fire department on 154.445 MHz and your local highway department on 37.900 MHz. With trunked systems, you can never tell on which frequency (again, among a group of three to 29 frequencies) a particular agency will communicate. Many people who monitored as part of their work (the news media), off-duty public safety officials, and casual scanner hobbyists, gave up monitoring when their local departments went trunked: It wasn't worth the effort. News reporting suffered, off-duty response of emergency personnel may have suffered, and the hobby suffered, as did the scanner industry.

Uniden has just changed all that. Their new TrunkTracker scanners, which made their debut at the recent Consumer Electronics Show in Las Vegas, will allow you to follow the communications of agencies which operate Motorola analog trunked radio systems. Simply put, these radios are a marvel. They work beautifully, they themselves are extremely flexible, and, perhaps best of all, TrunkTrackers are a blast to use.

The first TrunkTracker to be released is the Bearcat 235XLT handheld. This scanner uses the same tooling (case mold) as the popular Bearcat 220s and 230s, with only one keypad



Any number of departments may share a bank of frequency channels. In a busy system, each press of the microphone may change the channel, as illustrated by the arcs in the figure below. With frequencies no longer at issue, you can track the action by scanning for the department's ID. The TrunkTracker will keep up with the changes.

change: the TRUNK key. The 235 is a fully functional conventional scanner (some people have mistakenly assumed the TrunkTracker will only work on trunking systems). The 235 operates either in conventional or trunking mode, though not both at one time. Also, while you are in the trunking mode, only one trunked system—which can represent hundreds or thousands of users—can be monitored at a time.

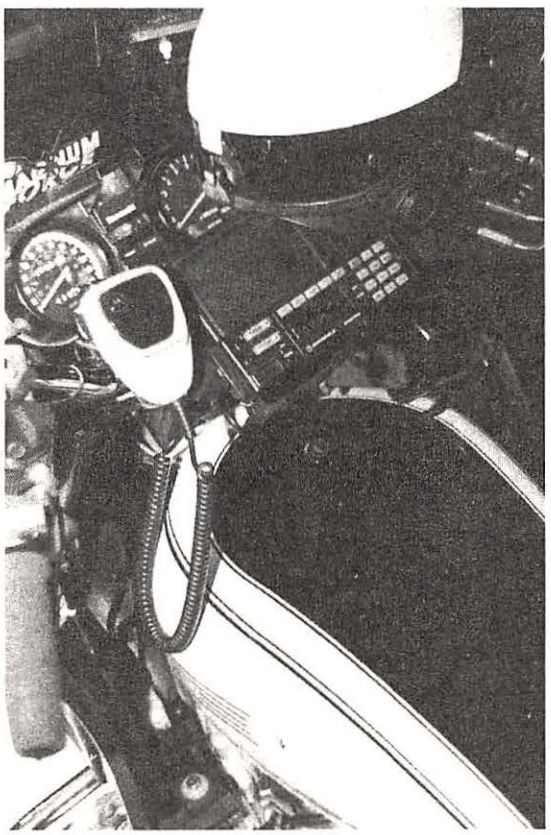
Channel capacity of the 235 has increased 50 percent to 300 channels, as opposed to the 200 channels previously included in the 220s and 230s. Band coverage remains the same (standard scanner ranges, including 800 MHz and VHF aircraft). In conventional search and scan mode, the radio will operate as it always has.

There are a couple of minor changes. The TRUNK key replaced the WX (weather) key. Now, to select weather search, which scans all NOAA weather frequencies for an active channel in your area, the user hits the SERVICE key. Weather is now part of Service Search, along with Police, Air, Marine, Fire/Emergency. One handy little new feature of Marine service search is that when an active channel is landed, the scanner display will flip-flop between the active frequency and the marine channel number, e.g., "156.800" flashes alternately with "CH 16."

Now on to what you really want to read about: TrunkTracker operation and features. You'll see as you read the report below that Uniden worked hard to make TrunkTracker functions as intuitive and as "scanner-like" as possible.

Programming

To make TrunkTracker work, users first enter the frequencies of the trunking system they wish to listen to (using the repeater output frequencies), just as they would program a conventional scanner. Uniden will be supplying a book of trunking systems and frequencies around the nation, prepared by Rich Barnett, in the box with the scanner. *Police Call* or one of the CD-ROMs on the market which contain the FCC database are also good resources for this information.



Motorola analog trunked radio systems, such as the Spectra model used on Miami's police motorcycles, are the most commonly used trunked systems.

Before you begin entering frequencies, though, you first must tell the scanner that you are about to program a trunking bank. You do this by pressing and holding the TRUNK key for 2 seconds. The radio emits a double-beep tone and the bank icons begin to flash in the display. The user then identifies which bank (1 through 10) he wishes to program with a trunked system. Once the bank has been selected, the display jumps to the first channel in the desired bank (channel 91 in bank three, for instance). The TRUNK icon appears in the display as the user programs the frequencies for the chosen system.

If a user enters a non-800 MHz trunked repeater output frequency, he will receive an error message. The initial TrunkTracker models will not track 900 MHz systems, although this feature is contemplated for future versions. As of today, there are no known 900 MHz analog public safety systems in the U.S.

Search

Once the programming is done, the user will hit the SEARCH key and you'll notice the scanner zip through those programmed frequencies as it looks for the data channel which controls the system. The data channel broadcasts a continuous stream of data and sounds like a non-stop braaaaap. The data channel generally changes every 12 to 24 hours, but this has no effect on TrunkTracker operation.

Once the radio has acquired the data channel (it usually takes a couple of seconds at most), the radio will begin to trunk. Instantly, talk group ID's will begin to appear on the

The Uniden BC895XLT "TrunkTracker" looks exactly like the BC890XLT, except for the "trunk" key.

display, such as "512" or "20448." Frequencies, now irrelevant, are nowhere to be seen. It's a completely new paradigm for scanning, and it's enjoyable to use and watch in action.

These group ID's represent a cluster of users. "512" might be Police Patrol, East Side Operations, and may include 30 officers on foot and in squad cars.
"20448" might be the administrative group for the Sanitation Department supervisors.

You won't know exactly who uses these IDs until you've either monitored for awhile, or until talk group ID lists start showing up in frequency books and on web sites. You'll easily nail down police, fire, and emergency medical system (EMS) IDs in a matter of a few minutes. Sometimes—for instance, on countywide trunked systems which serve a number of city and town public safety agencies— it could take an hour or so to figure out which ID matches up with which community. ID cracking is half the fun of TrunkTracker! The important IDs are easy: Figuring out the secondary channel ID for the town of Podunk building inspectors ... that's the challenging part. Rest assured, hobbyists will have a ball with it.

There is a web site, **trunktracker.com,** under development that may contain system manufacturer information (Motorola, Ericsson/GE, Johnson, etc.) frequency data and ID information. We also suspect that IDs may begin showing up in frequency guides in the near future.

Delay

Let's take a hypothetical group ID of 2368. In TrunkTracker search mode, as soon as this (or any) ID comes up active, you'll be able to listen in on that talk group's conversation. In delay mode, after a transmission ends, the scanner will hold that particular talk group ID in the display for five seconds, waiting for a reply. Numerous other groups on the system may be communicating, but TrunkTracker will be looking at the data coming off the control channel for the delayed ID to become active again. If the ID is not active within five seconds, the 235 will return to trunk search or scan.

Hold

Just as with HOLD in conventional scan mode, HOLD in trunking mode allows you to sit on a conversation indefinitely. Rather than holding on a frequency, however, you're holding on a group ID. This is where the trunk tracking effect is particularly noticeable. You can sit and hold on a group, such as EMS on-scene operations, and not hear any other group on the system. No matter which frequency the EMS conversation hops to, you'll follow. Again, frequencies become as meaningless to the TrunkTracker user as they do to the actual system user. It will appear as though EMS tactical has a frequency all to itself.

Let's say you have your BC-235 with you and you suddenly see an ambulance race down the street. You don't have the ambulance ID placed into memory of any sort (SCAN LIST memory is described below), but you know the ID for EMS is 2368. To place an ID into temporary memory, users can follow these keystrokes: HOLD, ID (2368), HOLD. The HOLD icon will flash and TrunkTracker will only listen for the activity of this group.

Channel Activity Indicators

When you think of conventional scanning, you think of a radio which sequentially checks for activity on one memory channel after another. If your scanner passes channels 1 through 14 during a scan and finds no activity until channel 15, and you then begin to listen to the activity on channel, or frequency, 15, you have no idea whether or not there is now activity on channels 1 through 14 (with the possible exception of a priority check on channel 1). With TrunkTracker, this concept is turned on its ear. If you have the unit in HOLD, SCAN, or other modes, TrunkTracker will display for you the actual activity of the system. Here's how it works:

Every frequency you enter for a trunked system correlates to a "channel activity" indicator. These small square icons in the BC-235 display are the same icons used to indicate which banks are active during conventional scan, except there are double the number of icons available (20) in the trunking mode. While frequencies become meaningless once you begin trunking, the activity lights provide a second-by-second snapshot of system activity by displaying active frequencies via the channel indicator icons. It's a kick to watch the activity of a busy system as the lights flash on-and-off across the screen. If you're holding on one ID, waiting for activity from that group, you can see how much you're missing by watching the channel indicators. This is a completely unique, new way to scan!

Note: If more than 20 channels are programmed for a particular trunked system, for example 29, then activity on the 21st through 29th channels are shown on activity lights 1 through 9. There is no way to discern whether it is channel 1 or 21, or both, that is active. The BC-895, with its larger display, has 30 indicator lights.

Search/Monitor Mode

With the SEARCH/MONITOR mode, you can not only watch the channel indicators to see how active the system is, you can also view the IDs which are currently on-the-air. Press and hold the SEARCH key for 1.5 seconds and you'll receive a double-beep tone. You will no longer hear transmissions from the groups, but your TrunkTracker will flash the active ID numbers (along with the indicator lights), approximately one per second. IDs which are locked out will also flash in the display with the L/O icon. This is a good way to discover which are the predominate users of a system.

Scan Lists

Each of the 10 banks of a BC-235 scanner can be a trunking bank and these banks can be scanned conventionally if so desired. Each active trunking bank contains five SCAN LISTS of ten memories each (50 total per system, 500 maximum for 10 systems). In any trunked bank, you could assign Lists One as your police list, List Two for fire, etc.. Once you determine your favorite IDs, you can manually enter them into SCAN LIST memory by putting the radio into MANUAL mode and entering an ID, just as you would enter a frequency in conventional mode.

You can also enter an ID into SCAN LIST memory location on-the-fly, as interesting IDs become active in SEARCH mode. Here's how this would work.

Let's say that you have TrunkTracker in SEARCH mode. An ID of 5226 becomes active and it's the police detail at a college

football game. You decide that this would be an interesting ID to place in memory for future weekend monitoring. You can enter this ID into memory two ways:

1) Simply hit the "E" (ENTER) key while there is activity on the ID. This will place the ID into the first available memory location.

2) Hit the PRIORITY key. You can now use the UP and DOWN arrow keys to scroll through all 50 memory locations and select the location into which you would like to place this ID. Once you hit the PRIORITY key, the ID that interests you will remain in the display, even if the conversation on the group ends, until you've selected the memory location and have hit the ENTER key.

Note: The PRIORITY key is also used to toggle the display between showing which SCAN LIST banks are active—since you can turn banks one through five on or off individually, just as in conventional scan mode—or showing the channel indicators described above.)

Lockout

Trunk lockout works similar to lockout in conventional scanning; however, instead of locking out a frequency, you use the LOCKOUT key to lock out a group ID. If you don't want to hear the sanitation group on the system, just lock out that ID as soon as it becomes active, or, if you know that ID in advance, you can enter it while in the HOLD mode and lock it out manually.

Lockout becomes more useful in the case of data bursts sent over a trunking system. In many areas of the country, water meters, door alarms, traffic signals, and other types of mechanical devices are each assigned a group ID on a system. These individual devices—and there could be hundreds of them in a system—transmit levels and various other data to a central controller.

Listening to such a trunked system in conventional mode, you hear practically non-stop beeeeep, booooop, beeeep, in between voice transmissions. Just like voice groups, these data groups are apparently randomly assigned available frequencies on the system, making it even more difficult to try to follow a normal conversation on a standard receiver.

With TRUNK LOCKOUT, though, you simply lock out each of these data ID's so that, in SEARCH mode, you will no longer hear these annoying drones. Imagine trying to do that on a conventional scanner!

Other System Notes

There are two types of conversations that you will *not* hear on TrunkTracker. Telephone interconnect calls, which generally always occur on the same one to three channels of a trunked system, are not trackable, although they are in conventional scan mode, since they are not known to change frequency once an interconnect call has been initiated. Private calls, which are one-to-one direct communications between two units, are also not tracked. Unscientific studies have shown that these types of calls represent a small fraction of all the calls broadcast over typical trunked systems.

Fleet Maps And IDs

TrunkTracker comes with 15 default fleet maps which the user can select for Type I and other non-Type II systems (the BC-235 defaults to Type II where no maps need to be set). Select one of the 15 maps, using the DATA and HOLD/LIMIT keys (it only takes a couple of keystrokes and only needs to be set once) and you're off. There is also a USER DEFINABLE mode for those sophisticated users who wish to enter their own custom maps.

In this article we've used the term "Group"; however, "talkgroup"—or in the case of Type I users, "fleet" and "subfleet"—would be more appropriate terminology. Fleet and subfleet pertain to a hierarchical structure of the system users, i.e. your local fire department might operate a fleet, with the subfleets consisting of the various operations of the department:

FLEET 1 FIRE DEPARTMENT

Subfleet 1	Fire Dispatch
Subfleet 2	Fire Operations
Subfleet 3	Fireground 1
Subfleet 4	Fireground 2
Subfleet 5	Arson Squad
Subfleet 6	Supervisors

As a fire captain changes "channels" on his handheld radio, he accesses different subfleets and therefore the group ID he will use changes as well. (Individual unit IDs stay the same; however, TrunkTracker does not make any special use of this feature.)

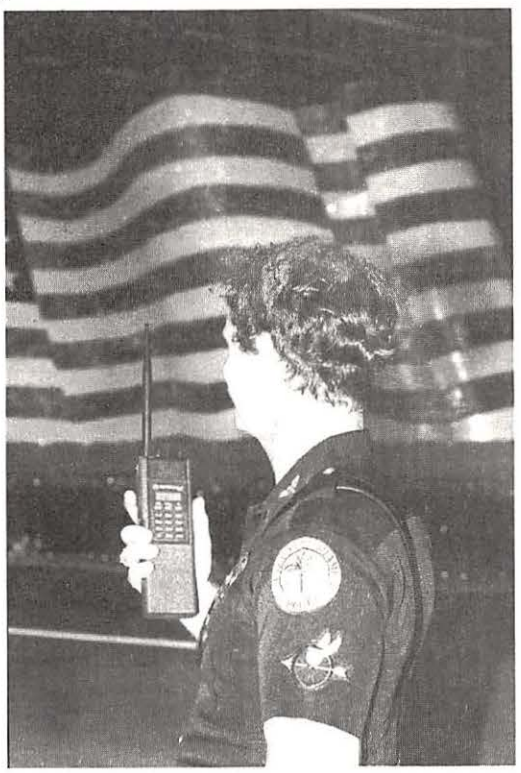
For Type II systems, which are apparently the newer and more advanced networks, no fleet map is required, as there is a flat hierarchy.

TrunkTracker defaults to Type II mode and, after you've programmed the frequencies, all you need to do is hit the SEARCH key and you're trunking.

The DATA key is also used to identify the bank in which you're trunking, since the bank indicators, which are active in the conventional mode, are normally used as either channel activity indicators or as Scan List indicators in the trunking mode.

Future Models

One question that will undoubtedly arise is why didn't Uniden address other trunking protocols, such as Ericsson/GE's EDACS system? EDACS is a public safety trunked system that is used in Denver, New Orleans, and



other areas. This system is actually more of a nightmare to monitor conventionally, as beeps and buzzing tones and sometimes even jingles are broadcast over the air, along with the voice transmissions.

There are, however, far more Motorola trunked public safety systems than there are Ericsson systems. And, Uniden has acquired rights to the unique G/WIZ technology, which eliminates the excruciating (to non-system users) beeps and buzzing of GE/Ericsson systems, for use in future scanners. In the meantime, G/WIZ boards can be installed in your BC-235, and in most other scanners, as an after-market device.[1]

In addition to the BC-235, other TrunkTracker models are planned. While the 235 is scheduled to be available in late March or early April, the base-model Bearcat 895, a significant upgrade to the BC-890, should be available by this summer. While the outer case of the BC-895 will look exactly the same as the 890, the display and internal operations are quite different. The 895 will have 30 trunking indicator lights, built-in CTCSS (with tone encode and tone reading planned), a signal strength meter, and an RS-232 port for computer download and control. More TrunkTracker scanners are now in the planning stage, but they are planned for the future.

The Bottom Line

Uniden must be commended for this bold step they have taken. While Uniden may have taken a few shots in the past, the company has wowed the industry with a technological advancement that is stunning in its importance as well as in its easy-to-use interface.

Scannists have failed to credit Uniden with the fact that it is not interested in competingwith the manufacturers of $2000 receivers. There are only so many customers for Rolls Royces. But, with TrunkTracker, Uniden has actually leapfrogged its high-end competitors with a radio that, while relatively inexpensive, is, in many ways, far more valuable and innovative than any receiver manufactured in the last 15 years. TrunkTracker is, perhaps, the most significant industry advancement since the programmable scanner. It couldn't have come at a better time for the hobby.

Certain trade names mentioned in this article are the respective property of their owners. The TrunkTracker radios are available from Grove Enterprises; see ad on p. 13.

[1] *For information on G/WIZ, contact Scanner Master at 800-722-6701.*

Uniden BC 235XLT Specifications

Channels:	300 channels (30 channels x 10 banks) (20 channels search-skip memory) (20 channels service search skip memory)
Freq Range (Mode):	29 to 29.7 MHz (10 meter amateur band) 29.7 to 50 MHz (VHF low band) 50 to 54 MHz (6 meter amateur band) 108 to 136.9875 (Aircraft band) 137 to 144 MHz (Military land mobile) 144 to 148 MHz (2 meter amateur band) 148 to 174 MHz (VHF high band) 406 to 420 MHz (Federal gov't land mobile) 420 to 450 MHz (70 cm amateur band) 450 to 470 MHz (UHF standard band) 470 to 512 MHz (UHF "T" band) 806 to 956 MHz (Public service band, except cellular band) 162.400 to 162.550 MHz (.025 increments; WX channels)
Display:	LCD (with back light) 10 digits and special annunciator (Bank 1-10, SCAN, PRI, DLY, SRCH, BATT, HOLD, WX, L/O, DATA, P, KEY/L, POLICE, FIRE/EMG, AIR, MRN, TRUNK)
Controls/Switches:	Volume control with power off/on switch Squelch control
External jacks:	ANT jack: BNC type Stereo headphone jack: 3.5 mm Compatible 3.5 mm monaural earphone
Internal speaker:	8 ohms 0.5 watts
Power requirements:	Ni-Cd battery 4.8 VDC: 800 mAH (included) or AC 120V 60 Hz (with AC adapter AD-70U)
Scan/search rates:	Max 100 Ch/sec (scan) Max 100 step/sec (Turbo off) - VHF low/high band (search) Max 300 step/sec (Turbo on) - VHF low/high band (search) Max 100 step/sec - UHF/aircraft band (search) Max 100 step/sec - public service band (search)
Scan delay:	2 seconds
Audio Output:	Max 180 mW
Antenna:	50 ohms (impedance)
Operating temperature:	Minus 20 degrees to 60 degrees Celsius
Storage temperature:	Minus 30 degrees to 60 degrees Celsius
Size:	2.5 inches wide, 1.7 inches deep, 6 inches high
Weight:	12.6 oz.
Accessories:	CRX120 charger, 2 rechargeable long life Ni-Cd batteries, AC adapter, rubber antenna, belt clip, owner's manual, frequency guide, trunk system frequency guide, earphones

Break the Trunking Barrier!

The Exciting New Uniden BC235XLT 'TrunkTracker' Follows Trunking Signals!

"This single product will produce the most dramatic increase in scanning in decades. Vast public safety systems that have eluded scanners for years can now be monitored at the touch of a button."

—Bob Grove, Publisher, Monitoring Times

Compact and sleek, Uniden's new, handheld BC235XLT TrunkTracker lets you follow Motorola trunked communications from start to finish! Now you can monitor those elusive 800 MHz public safety communications that have previously escaped scanners by switching channels between transmissions.

And the BC235XLT Trunk Tracker offers other exciting features as well—conventional scanning of the 29-54, 108-174, 406-512, and 806-956 MHz bands (less cellular); 300 channel memory in 10 banks; 10 priority channels, individual channel delay and lockout; and choice of user-programmable search ranges or factory pre-programmed search of police, fire, emergency, marine, aircraft, and weather frequencies.

And included at no extra cost are a wall charger and two rechargeable batteries, BNC-base flex whip, frequency guide, belt clip, earphone, and instruction manual. See our site on the world wide web (**www.grove.net**) for specifications and updated information. Order **SCN 10.**

PRICED UNDER $350!
Uniden recommends we sell this revolutionary new scanner for well over **$400**, but Grove is selling the BC235XLT for **under $350** plus $8 UPS shipping! Call for exact price.

Phone or mail your order now — Take advantage of Grove's liberal trade-in policy for your old scanner, and **STEP UP TO 21ST CENTURY SCANNING!**

***NOTE:** Uniden expects to begin shipping the BC235XLT in April. We will not cash your check or process your credit card until your unit is shipped.

*Coming Soon...*The BC895XLT "Trunk Tracker"

Similar in appearance to the BC890XLT, the '895 represents a significant upgrade. This new desktop Trunk Tracker has 30 trunking indicator lights, built-in CTCSS (with tone encode and tone reading), a signal strength meter, and an RS-232 port for computer download and control. Like the BC235XLT above, this unit will follow agencies which use Motorola's analog trunked systems.

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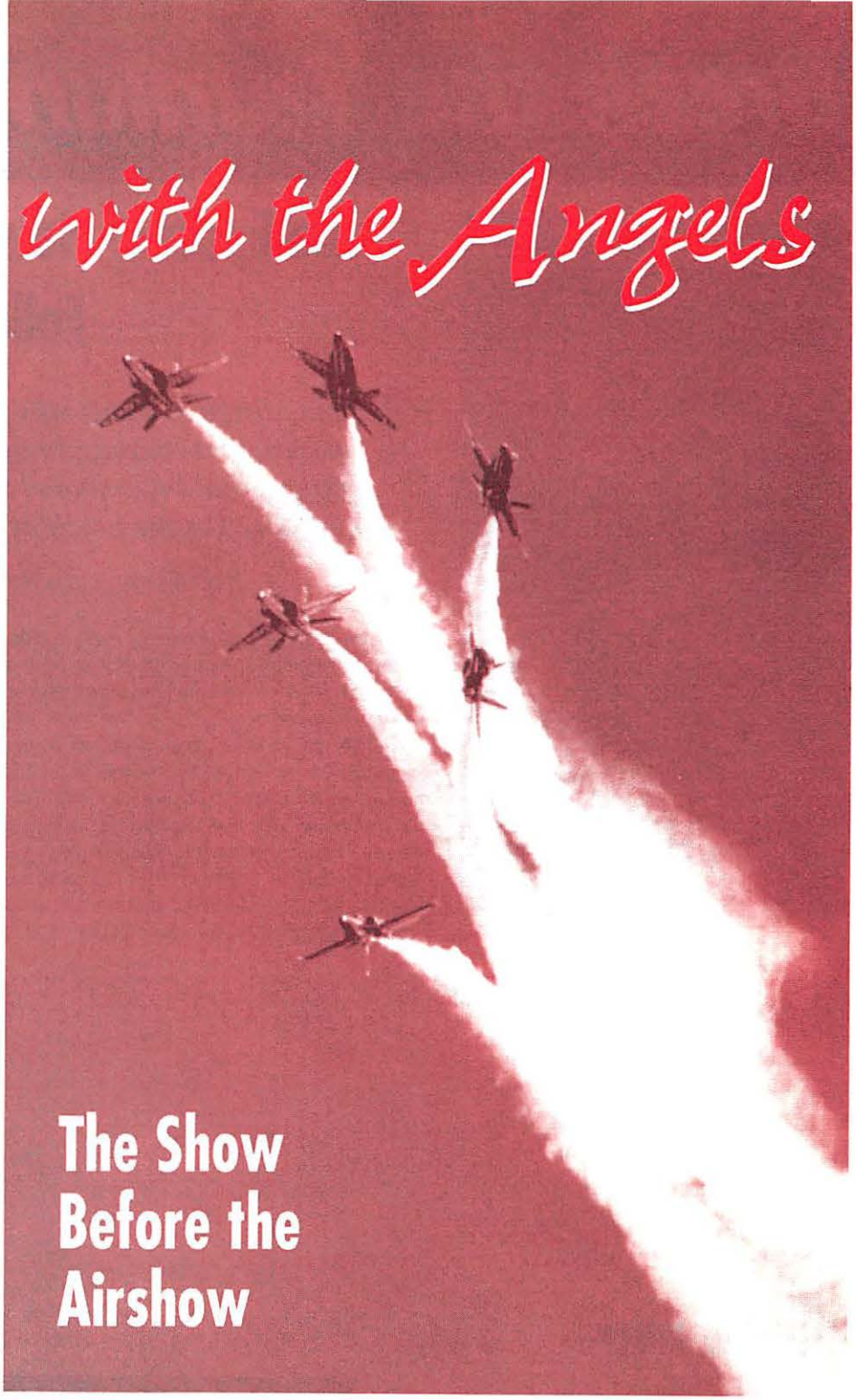
Flying with the Angels

By Les Butler KB8WKE

Picture yourself monitoring this nation's most awesome aircraft. You hear them report that they are 6 miles north of the tower; several minutes later, they fly right over your head! MT *takes you behind the scenes as the Blue Angels prepare for a major airshow.*



The Show Before the Airshow

My excitement began T minus two days before the public airshow at Selfridge Air National Guard Base in Mt. Clemems, Michigan. I was about to interview the U.S. Navy's Blue Angels on behalf of *Monitoring Times*. Since it's about a 50 mile ride from my house I had all the expected Blue Angel frequencies programmed into my AR-8K. About 5 miles west of the base I saw F/A-18's flying low. I quickly tuned to 345.9 MHz and heard, "2 miles north on the left an Amoco sign, 3 miles a white van on the right," "Roger I see them, copy that."

The Angels were in the process of scoping out the local landmarks for their precision flying. I began to breathe heavily (a sure sign of Scanner Addiction) as I realized I would soon meet these magicians of the sky in person.

T Minus Two Days

After a brief wait at the gate the base Public Affairs Officer arrived and shook hands with the press. He walked us to our vehicles and asked us to follow his truck into the base. We ended up near the maintenance hanger that the Blue's were using. Navy Petty Officer Second Class Keith Wilson approached me with a smiling face and heartfelt greeting and asked, "Who would you like to interview?" When I replied I'd be happy to talk to any of them, he thought for a second and asked, "How about the boss?" My grin went from ear to ear as I quickly jumped at the offer.

Feeling lucky, I asked if I could talk to a communications officer since this was to be for a communications magazine. He informed me that the maintenance chief would handle that and it should be no problem. After his little introduction we began the waiting game again. No problem; I had my scanner. I began monitoring the Blue's ground freqs. Bingo! 170.900 MHz yielded "See me? This is where the press is." "OK, send them over to the hanger."

The day was about to get very exciting.

Interviewing the Blue Angels

In a moment's time I found myself shaking hands with Captain Greg Woolridge, the com-

manding officer of the Blue Angels. I found the interview process to be difficult, since two of their aircraft were in the air buzzing us on the ground, giving the press a little show. I was juggling everything—scanner, notebook, pen, and camera—and I wanted to catch everything. Visual greed got in the way several times as my camera tried to capture that Kodak moment.

Since the interview was brief, I made sure to ask the question most on the minds of Blue Angel fans: why did the 1996 Captain quit? The reply was that he quit because of safety concerns he had with his own maneuvers. I was impressed with the courage it must have taken to think of the team over his career.

I felt I recognized Captain Woolridge from somewhere, and asked if he was in the cable TV special about the Blue's European Tour. He smiled and said, yes, he was in command during that time. Fortunately, with an experienced Blue Angels Commander like himself willing to step in, the change in captains caused the Blue Angels to cancel only two shows of their 1996 season.

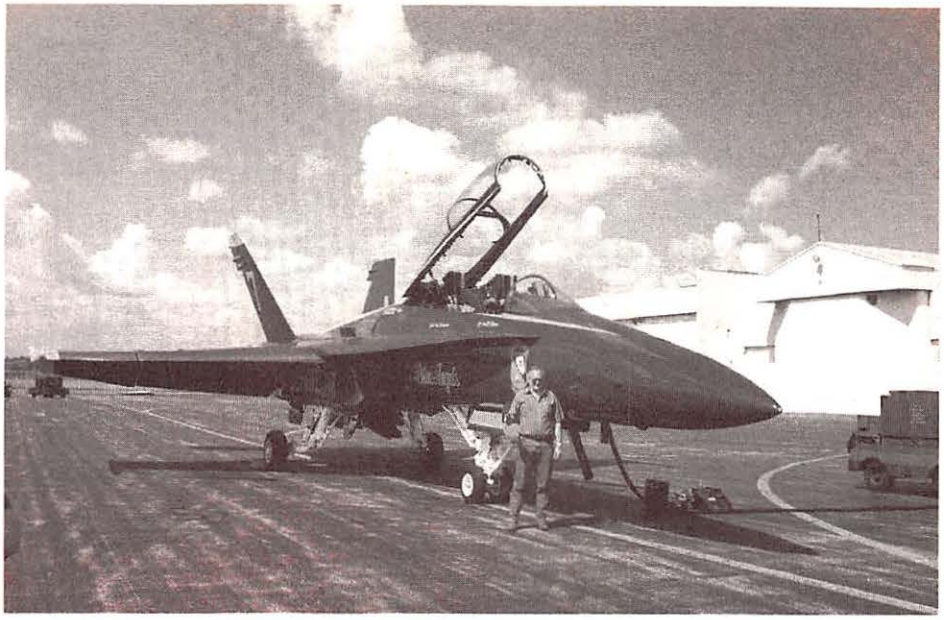
Captain Woolridge suggested that any youngsters who are interested in being a Blue Angel should study math and science and become active in a team sport to hone their teamwork skills. The Navy requires a degree in the sciences to even be considered for aviation.

The Blue Angels are strictly volunteers. The pilots and leader are rotated every two years: three every year so that there is an experienced base present. The support staff is usually rotated every three years. They return to normal duty after their stint with the team.

To fly, you need to be a Naval Aviator with fighter or attack experience and carrier experience totalling 1500 hours, which equates to about six years of flying in the Navy. The command slot requires 3000 hours of flight time and previous command experience.

The U.S. Marine C-130 transport that's painted with the squadron paint scheme and affectionately named "Fat Albert" is used to transport the support staff. This transport is also used in the shows to demonstrate the JATO (Jet Assisted Takeoff), in which they strap four rockets to each side of the aircraft. When the aircraft reaches takeoff speed, they ignite the rockets and the aircraft shoots upward at about a 45 degree angle. This enables the aircraft to use very short runways in times of war.

Since the Blue Angels were flying all during the interview I never did get to talk to the maintenance chief. When the planes are up he's always on duty, keeping them safe and in working order. Since the world is becoming a dangerous place to live lately—e.g., bombings at the World Trade Center, the Oklahoma Federal Building, and Centennial Park—we had two armed guards with us at all times. These guys carried fully automatic rifles, so it's a good thing they were calm and level headed.



The author poses in front of a Blue Angel F-18

T minus One Day and counting!

For those of you who own an Optoelectronics Scout—a frequency counter which will capture and store locally active frequencies—an airshow becomes a frequency expedition of enormous magnitude. I left my Scout in the car hooked up to an external antenna during the interview and carried it on my belt the day before and day of the show, capturing and storing active frequencies. Those of you without a Scout should become intimate with your scanner's search function.

It's now "Day Two": The Friday before the show is VIP day. VIP in this case means the handicapped, friends and family of the workers, local politicians, supporters, and, of course, yours truly. This is a relatively low key day—around 20,000 people instead of the 600,000 that will be there over the weekend. Most static displays aren't set up, but I'll be able to see them fly in!

That's right: the planes that don't fly during the airshow fly in the day before and, by so doing, treat the scanner listener to a full day of monitoring. You can even see the Blue Angels perform a special show.

After the Angels fly you'll want to park near the runway outside of the base, if there is a road there and base security lets you. I joined about 30 cars and did so for several hours. I was parked at the fence along the road and in the centerline of the runway. Standing 50 to 60 feet below a C-5 is a very humbling experience! Every single fighter that came in did a low fly-by first, then a landing. We saw F-14's, 15's, 16's, and F/A-18's. We also got to see the E-3 AWACS, C-5, C-17, B-52, and many, many more aircraft.

Standing under a C-5 on final approach is a humbling experience, as is seeing one up close and personal (right).

The Airbase

Don't let the fact that it isn't an Air Force base fool you: Selfridge is big. Its name actually came from the first military aviator to die in an air crash, Thomas Etholen Selfridge. On September 17, 1908, Selfridge was performing a demonstration for the Army with Orville Wright when the plane crashed. Orville survived, but Selfridge wasn't so lucky.

The airbase that carries his name was an Air Force base for 54 years; it celebrated 25 years as a Reserve base in 1996. Selfridge is the largest such base in the world (3,600 acres) and is a home to all of the branches of the active service, too. The following is a list of tenants of the base.

- **127th Tactical Fighter Wing**
  USAF (F-16) callsigns: Demons and Tejas (Texas), and (C-130) callsigns: *Lucky* for local flights and *Motown* when traveling out of the local area.
- **927th Air Refueling Group**
  USAF KC-135 tankers callsign: *Piston*
- **TACOMSA**
  U.S. Army Tank Automotive & Armaments Command.
- **75th Ordnance Company**
  U.S. Army (Explosive ordnance disposal) who,by the way, provide bomb disposal to the entire state of Michigan and the northern part of Indiana, including support of the U.S. Secret Service and the State Department.
- **U.S. Naval Reserve Readiness Center Detroit**
- **U.S. Naval Air Reserve Activity Selfridge**
  U.S. Marine Corps Wing Support Group 47
- **U.S. Coast Guard Air Station Detroit**
- **U.S. Air Force 339th Recruiting Squadron**
- **U.S. Air Force Auxiliary & Civil Air Patrol**
- **U.S. Border Patrol**
  Relocated from Detroit. This positions their operations between two Canadian border cities—Detroit and Port Huron.

Unexpected Excitement

Late Friday (T minus 1/2 day) I saw an U.S. Naval Air Reserve F-14 aircraft from VF-201 in Dallas, Texas (callsign Hunter 11) land and blow a tire. The pilot managed to keep it together, but pieces of rubber littered the runway and the airport had to be closed. At first I heard the tower on 340.700 MHz tell pilots that the airport would be closed for 20 minutes. This was not a good thing, since many aircraft were still arriving for the show.

To compound matters, the Blue Angels had used an extra half hour of closed airspace earlier in the day due to mechanical problems. While the planes are up for a show or practice, the airspace is closed for a 5 mile radius and from base level to 14,000 feet. Consequently, a good many planes were in a holding pattern for some time. The action picked up several minutes later when a U.S. Air Force T-38 trainer (Home 01) asked when he could land: he needed to land soon because he was running low on fuel.

About 20 minutes later he again called the tower and was told it could be another 30 to 40 minutes. The pilot then declared an emergency! "I need vectors to Detroit Metro now! I'm declaring an emergency! I want fuel and a battery cart." "Roger that, stand by, we will contact Detroit. Are you sure you don't want Detroit City instead?" The pilot then asked what size the runway was.

I never did hear what airport he was diverted to since I was running out of time myself and had to trek across town for home.

As you can see by the frequencies in Table 1, don't leave out any of the surrounding area police frequencies. They'll be busy handling all of the traffic leading into the base. They will also most likely be assisting the base police on the inside, too.

TABLE 1: Frequencies used during the Blue Angels Airshow at Selfridge ABGB, Mt. Clemens, MI

42.860	Michigan State Police
128.700	Airboss
163.375	Security
165.1125	Vehicle ground control
168.900	Blue Angels Ground Support
170.900	Blue Angels Pre Flight checks and ground support
173.4375	Police
173.5875	Crash/Fire
238.150	Blue Angels
275.350	Blue Angels
345.900	Blue Angels
413.250	Many different Comms including the AirBoss talking to the Pyrotechs (Setting off explosions for the show)
460.150	Mutual Aid channel for local police
460.250	Macomb County Sheriff
460.400	Macomb County Sheriff
460.425	Chesterfield Twp. Police
Other active freqs for the base	
11.447 USB	Refueling operations (Piston flights to operations)
40.450	National Guard
40.650	National Guard
40.850	National Guard
41.050	National Guard
41.250	National Guard
41.450	National Guard
143.900	Civil Air Patrol (callsign Red Robin)
148.150	Civil Air Patrol (callsign Red Robin)
163.625	U.S. Border Patrol
238.900	927 ARG refueling operations (Piston callsign)
259.950	Clearance Delivery
270.100	Automatic Terminal Information Service (ATIS)
275.800	Ground Control
282.700	Refueling (Piston callsign)
307.800	Cleveland Air Route Traffic Control Center
314.200	927th Air Refueling operations
342.500	PMSV Metro (Pilot to Metro Service)
381.700	927 ARG operations (aircraft callsign Piston) (sometimes heard in secure mode)
381.800	U.S. Coast Guard Detroit Air
391.900	Radar Approach
395.900	Departure Control

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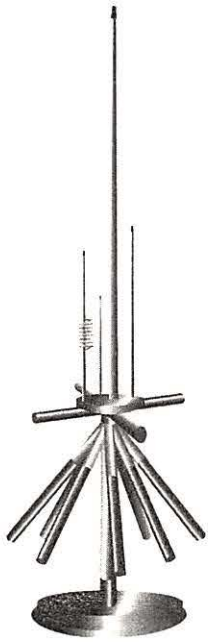

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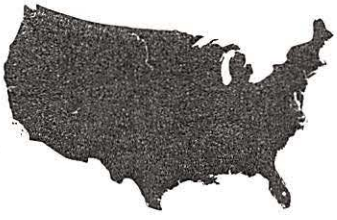

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TABLE 2: Pontiac Oakland Airport Frequencies

118.250	Clearance Delivery
120.500	Tower
121.100	Ground Control
121.900	Ground Control
122.950	Unicom
123.700	Tower
125.450	ATIS
143.900	Civil Air Patrol (Working the open house)

Lift Off!

At last the airshow is officially here! After two days of monitoring and picture taking you'll be charged up for the show and armed with an arsenal of frequencies to keep you busy.

The gates at this airshow opened at 8 a.m. and the show started at 11 a.m. I arrived about 8:15 to beat the tremendous amount of traffic expected. It also got me there in time to plan my day of monitoring. Another plus to arriving early is beating the crowds to the tours onboard many of the aircraft. Picture taking is also an easier task before the swarms of people arrive.

I headed for the KC-135 and C-130 tours, which were open when I arrived. I noticed the AWACS crew moving the boarding ramps nearer to the plane about 9 a.m., so I stood by and waited. About 10 minutes later I was one of the first onboard. I'm glad I was too, because when I exited the aircraft there were about 100 people in line.

Of course I had the Scout clipped to my belt while walking around. I used the antenna from my Yaesu FT-51 ham radio, which pulls in VHF and UHF atastonishing distances. After a few hours it was time to make my way towards the tower for a better view of the show. I also wanted to get close to the tower so I could "Scout" out the airboss.

That reminded me to reach down and unclip the Scout from my belt. Thumbing through the frequencies stored in memory, I spotted 128.700 MHz. Could this be the airboss? I punched it into my scanner and presto, it was, indeed. Capturing this frequency gave me the jump on everything that was to happen during the show. The Scout also found 413.250 MHz, which ended up being the airboss talking to the pyro-techs. I heard them coordinating the mock explosions several minutes before they occurred.

Having seen the Blue Angels fly twice in the same week I opted to exit the show early. This put me in position to escape several hours before the 350,000 fans rushed the exit gates. When I finally arrived back at home I fired up the radios about 6 p.m., thinking the planes would be returning to their home bases. The scanner stopped on 307.800 MHz (Cleveland Center) and I heard Strike 11 leaving the airfield. So my "monitoring times" for the week came full circle.

A local airshow is a good place to catch public service frequencies, too. The Oakland Co Sheriff's Dragoon: armor plated personnel carrier.

Bonus Show

A few weeks after the Blue Angels show I was lucky enough to take in an "Open House" at a local airport. Pontiac Oakland Airport is a very busy airstrip north of Detroit. It's also home to

TABLE 3: Blue Angel 1997 Air Shows

MARCH		
15	NAF El Centro, CA	Open House
22-23	Mesa, Arizona	Air Races Fair
APRIL		
5-6	MacDill AFB, Florida	Airfest '97
12-13	MCAS Cherry Point, NC	Airshow
19-20	NAS Fallon, Nevada	Airshow
25-27	MCAS El Toro, California	Airshow
MAY		
3-4	NAS Key West, Florida	Open House
10-11	Brunswick, Georgia	Military Appreciation Weekend
17-18	Montreal, Quebec, Caaada	Airshow
21-23	U.S. Naval Academy, MD	Commissioning Week
24	NAS Patuxent River, MD	Air Expo '97
JUNE		
31(MAY)-1	Willow Run, Michigan	Air Michigan Airshow
7-8	NAS Lemoore, California	Central Valley Lemoore Airshow
14-15	Hillsboro, Oregon	Rose Festival Airshow
21-22	NAS/JRB Willow Grove, PA	Sounds of Freedom Airshow
28-29	North Kingstown, RI	Rhode Island National Guard Open House
JULY		
5-6	Fargo, North Dakota	Airshow
12	Pensacola Beach, Florida	Airshow
19-20	NAS Brunswick, Maine	Great State of Maine Airshow
26-27	Kansas City, Missouri	Airshow
AUGUST		
2-3	Salinas, California	California International Airshow
9-10	Seattle, Washington	SEAFAIR SummerFest
15-17	NAS Miramar, California	Airshow
23-24	NAS Corpus Christi, Texas	Airshow
SEPTEMBER		
30(AUG)-1	Jackson, Mississippi	Sky Parade
6-7	Grand Junction, Colorado	Airshow
13-14	Fort Smith, Arkansas	Airshow
20-21	NAS Oceana, Virginia	Airshow
27-28	Smyrna, Tennessee	Tennessee Aviation Days
OCTOBER		
4-5	El Paso, Texas	Amigo Airshow
11-12	San Francisco, California	Fleet Week Airshow
18-19	Liberal, Kansas	Mid-America Airshow
25-26	Tulsa, Oklahoma	Centennial Celebration Airshow
NOVEMBER		
1-2	NAS Cecil Field, Florida	Open House
8-9	NAS Pensacola, Florida	Open House

The Blue Angels schedule was officially released Jan. 16, 1997, by the Assistant Secretary of Defense for Public Affairs. This schedule is courtesy of the internet Milcom email list and study group.

most of Detroit's business jets, including Chrysler Corporation's Pentastar Aviation division.

The night before the open house I monitored 120.500 MHz—one of the tower frequencies. I was treated to communications from an F-16 (Demon 1), a Navy P-3, and a Huey Cobra, all en route to the show. The words "Open House" meant it wasn't really a full-fledged show, but it also meant the airport was still open for air traffic. The air traffic controllers had their hands full. The traffic on 120.500 was unbelievable! These controllers had to contend with several airplanes and helicopters constantly giving rides to the public as well as keeping up with all of the normal traffic. Add into the mix two or three World War Two fighters performing fly-by's, and you have a frequency that is almost never quiet.

I arrived just before the F-16 departed, as he treated everyone to an amazing and aggressive takeoff straight up and disappearing into the sky. We also witnessed a Huey Cobra takeoff. Even though there weren't as many planes as in the military show, the radio provided nonstop action all day. It's also a great place to snap a picture of your local police and fire vehicles.

Any questions? Send me an e-mail message at ***<lsbutler@cris.com>*** *I also invite you to visit my homepage at* ***http://www.cris.com/~lsbutler.*** *For more information plus frequencies for the USAF Thunderbirds and for many airshow sites, see the Monitoring Times homepage at* ***www.grove.net***

Table 4: U.S. Air Force Thunderbirds 1997 Schedule

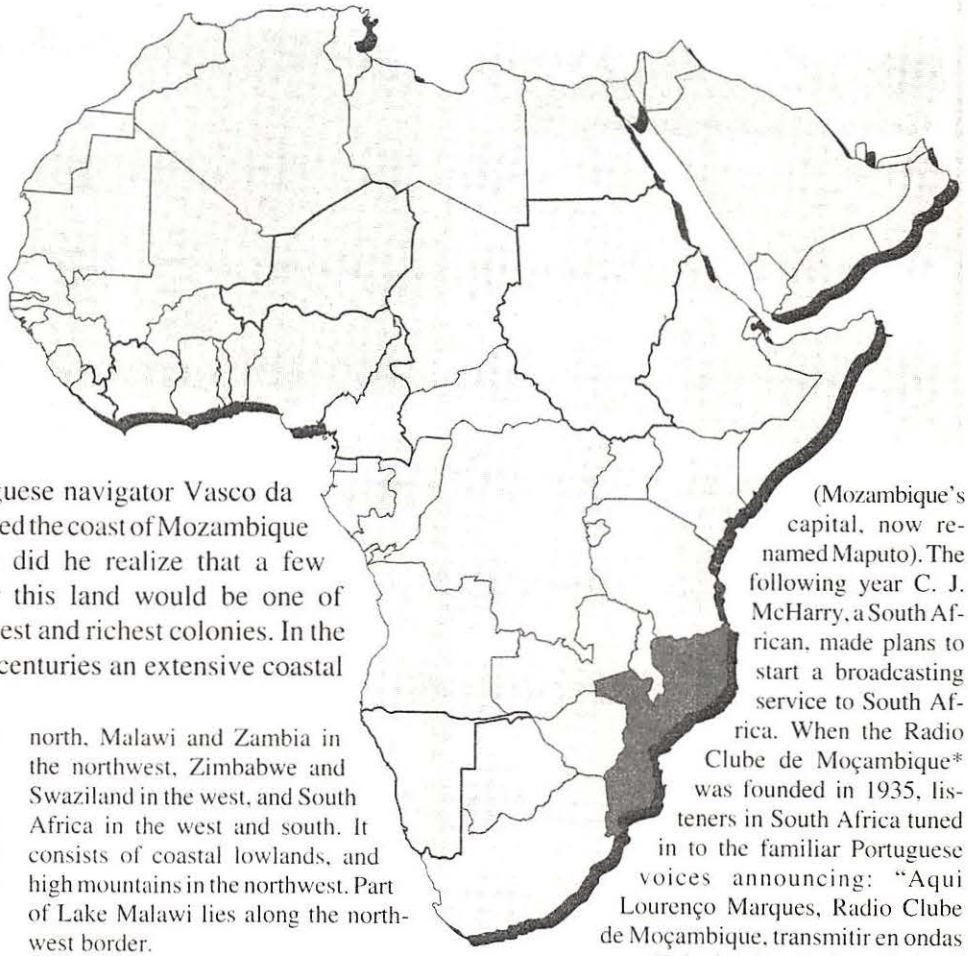
APRIL	
5-6	Patrick Air Force Base, Florida
12	Marine Corps Air Station Yuma, Arizona
13	Fresno, California
19	Louisville, Kentucky
26	Nellis AFB, Nevada
MAY	
3-4	Fort Lauderdale, Florida
17-18	Andrews AFB, Maryland
24	RAF Mildenhall, United Kingdom
28	U.S. Air Force Academy, Colorado
31	Broomfield, Colorado
JUNE	
1	Broomfield, Colorado
7	Scott AFB, Illinois
8	Grissom Air Reserve Base, Indiana
14-15	Oklahoma City, Oklahoma
21-22	To be determined
28	Battle Creek, Michigan
JULY	
4	Hickam AFB, Hawaii
12-13	Yakima, Washington
19-20	Dayton, Ohio
23	Cheyenne, Wyoming
26-27	Naval Air Station Whidby Island, Washington
AUGUST	
2-3	Hanscom AFB, Massachusetts
5-11	Mid-season Break
15	Batavia, New York
16-17	Columbus, Ohio
23-24	Chicago, Illinois
30	Peterson AFB, Colorado
SEPTEMBER	
1	Randolph AFB, Texas
5-6	Langley AFB, Virginia
7	Moody AFB, Georgia
13-14	Syracuse, New York
20-21	Youngstown, Ohio
27-28	Houston, Texas
OCTOBER	
4-5	Midland, Texas
11-12	Birmingham, Alabama
18-19	Edwards AFB, California
25-26	NAS New Orleans, Louisiana
NOVEMBER	
1-2	Eglin AFB, Florida
8-9	Daytona Beach, Florida

Courtesy Bruce Ames via Claude C. & Kurt S.

Mozambique

Land of Promise Unfulfilled

By Colin Miller



When the Portuguese navigator Vasco da Gama discovered the coast of Mozambique in 1498, little did he realize that a few centuries later this land would be one of Portugal's largest and richest colonies. In the 16th and 17th centuries an extensive coastal trade in gold and ivory was developed with the Arabs, who had already established settlements along the East African coast.

In 1544 the explorer Lourenço Marques visited the territory around Delagoa Bay, and built fortifications at the site of the city that was later named after him. The Dutch set up a trading post here in 1721, the first attempt at a permanent settlement. It was for many years one of the unhealthiest places in Africa, being notorious for fever and a bad climate. The real growth of LourençoMarques was stimulated by the construction of the railroad to South Africa just over a century ago. It was for many years a popular holiday resort for South Africans, and the luxurious Polana Hotel provided a Continental atmosphere. Known as Maputo today, the population is over a million.

Mozambique has a total land area of 309,494 square miles and a population of more than 17 million. It lies along the southeast coast of Africa, and is bounded by the Indian Ocean on the east, Tanzania in the north, Malawi and Zambia in the northwest, Zimbabwe and Swaziland in the west, and South Africa in the west and south. It consists of coastal lowlands, and high mountains in the northwest. Part of Lake Malawi lies along the northwest border.

Ethnically, the population can be divided into three groups. The Tonga group live south of the Save (Sabi) River. Between the Save and Zambezi is the Karanga group. The Nyanja inhabit the northwestern part of Mozambique. The Limpopo, Save, and Zambezi are the main rivers. It is mainly an agricultural country, and sugar cane, cashew nuts and shrimp are the major products.

Radio — the Beginning

Broadcasting began in Portuguese East Africa on March 18, 1933, when a small station opened in Lourenço Marques (Mozambique's capital, now renamed Maputo). The following year C. J. McHarry, a South African, made plans to start a broadcasting service to South Africa. When the Radio Clube de Moçambique* was founded in 1935, listeners in South Africa tuned in to the familiar Portuguese voices announcing: "Aqui Lourenço Marques, Radio Clube de Moçambique, transmitir en ondas curtas. This is the Radio Club of Mozambique."

The station, affectionately known as LM, presented most programs in English, and a few in Afrikaans, with popular music and entertainment predominating. When the Portuguese government gave McHarry the right to sell advertising on the air, LM introduced commercial radio to southern Africa.

Colonel Richard L Meyer had been associated with the International Broadcasting Company of London. This company operated English stations, and Radio Toulouse, Radio Lyons, and Radio Normandy in France. In 1947 he took over the management of LM

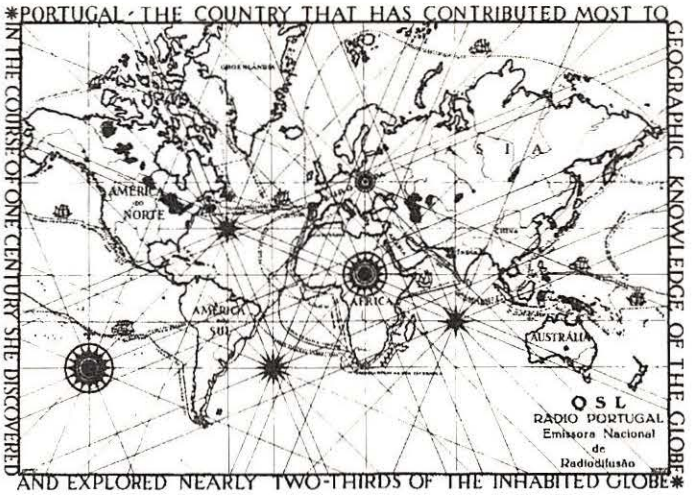
Radio in association with John Davenport—later an executive of the Reader's Digest Association—and beamed this highly successful commercial radio service into South Africa.

The Golden Years

In 1948, *Anything Goes* was one of the first South African-produced radio variety shows. It was recorded by Charles Berman, produced and hosted by Peter Merrill, scripted by Monte Doyle, and featured Dan Hill and his orchestra (not to be confused with the Toronto-born singer-songwriter) and other well-known entertainment personalities in South Africa. These celebrities provided many subsequent radio productions, especially after the birth of Springbok Radio in 1950, the first commercial station on South African soil.

Anything Goes was recorded in front of a "live" audience in the 20th Century Theater in Johannesburg, for broadcast on LM Radio. The show proved to be so popular that at one performance in 1949, 4,000 people, surging into the theater, broke the large glass entrance doors! Another program at that time, *This Is How*, provided household hints and other information for housewives, as well as contests which awarded prizes of hampers filled with sponsors' products.

This was the golden era of radio in the region. One of the most popular programs for many years was *Lucky Dip*, for which listeners sent in music requests and dedications for broadcast. One of the most popular broadcasters on the station at that time was David Davies, the "man with the golden voice." When rock 'n' roll was beginning to make its presence felt in the fifties, it was quite common to hear requests from various fan clubs for hits by their performing stars—Elvis Presley, Pat Boone, Cliff Richard .... Or, you would often hear anonymous requests: "to Cindy, from you-know-who." The end of the show always featured a drawing for gift certificates for record singles.



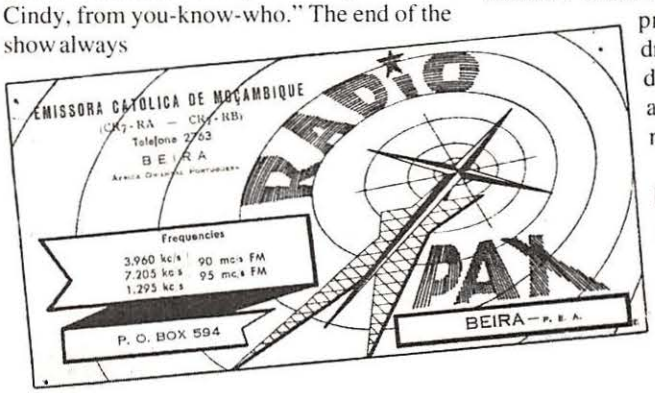
Old map of Portugal's explorations and colonialism boasts that explorers reached two-thirds of the inhabited globe in one century.

The youngsters were not forgotten, either. Each afternoon at 4:00 there was a program of birthday greetings and music requests, followed by serials such as *Superman* and specialty shows for children.

Also in the fifties, new transmitters were added, and a separate service was available with religious programming during the evening on a frequency in the 60 meter band. This featured various American syndicated programs like *Back to the Bible, Hour of Decision,* and *The World Tomorrow*.

During this time, LM Radio carried out a series of stereo tests on shortwave. These were the first such tests in southern Africa, and to my knowledge the first on shortwave in the world. Two frequencies were used in the 60 meter band, one for the left channel and the other for the right. This meant that you had to have two separate receivers to achieve the stereo effect.

Not too many households had more than one radio in those days, as transistor radios were only just coming on the market. I was one of the unfortunate ones who could not enjoy the program in stereo. I had to flick back and forth between the two frequencies but couldn't make much sense of it. The test program included a short drama presentation with some dialogue between two people, and either a ping-pong or tennis game.



Changes — more changes

The station underwent a major format change in the late fifties, as the new trends in music were attracting the younger set. The block programming was replaced by DJ's playing rock 'n' roll and teenbeat music. LM was becoming more popular than Springbok Radio in South Africa, especially for teenagers and young adults. This continued into the sixties and seventies.

It was political changes, in both Mozambique and in Portugal, that put to an end the direction the station was headed. In 1962 the Marxist FRELIMO movement had begun its terrorist activities in Mozambique. A guerrilla war developed in the north of the country and the civil war spread. However, independence wasn't obtained until the Salazar dictatorship in Portugal was overthrown in a coup d'état April 25, 1974. Portugal's Prime Minister Caetano and President Tomás were deposed, and Gen. Antonio de Spinola became provisional President.

A European uprising took place in Lourenço Marques in September of that same year. The radio station was handed over to the Armed Forces, and FRELIMO took over the local administration. LM Radio had been under SABC control since 1972, and the station had been relayed on local mediumwave transmitters in South Africa.

On June 25, 1975, independence was achieved from Portugal. The People's Republic of Mozambique was created with a Marxist government, and Samora Machel became its first President. The current president, Joaquim Chissano, was appointed Prime Minister. Radio Clube de Moçambique was renamed Radio Moçambique, and was controlled by the state. On October 12, the LM Radio facilities were nationalized, and the existing station finally closed, moving to Johannesburg as Radio 5.

Broadcasts in Portuguese and vernaculars

Of course, during the years that LM Radio was on the air, RCM also operated a domestic Portuguese service. This was also heard clearly in South Africa and provided a radio service for the large Portuguese community there. At one time RCM was operating up to four programs, including LM Radio.

Shortwave regional stations were opened in the fifties at Nampula, Quelimane, and Porto Amelia (now Pemba). These stations broadcast in Portuguese as well as local vernaculars. In June 1969 the Dondo station opened near Beira with two 10 kW, one 25

kW, and one 100 kW shortwave transmitters, as well as one 50 kW and two 10 kW medium wave transmitters. At least one of the shortwave units is still operating on 3370 and 9637 kHz.

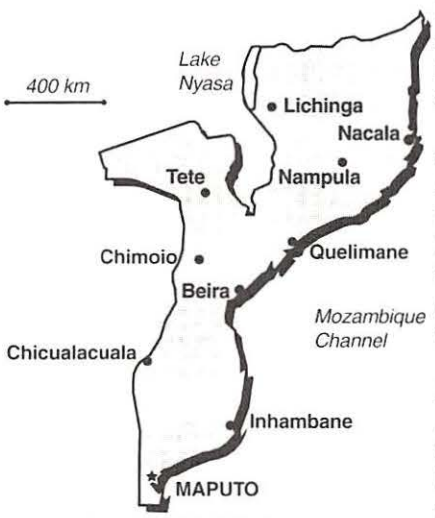
Private independent stations

During the Portuguese colonial period, a few independent private stations were on the air. All of these were nationalized in 1975 when the new government came to power. Refer to the table listing stations operating in 1954. **Emissora do Aeroclube da Beira**, a commercial station operated by the Air Club of Beira, was on the air in the late forties using a 300 watt shortwave transmitter with the call CR7IB. By 1958 the power had been increased to 5 kW. **Radio Pax**, also located in Beira, opened in 1955. It was a religious station, operated by the Franciscan Fathers. It used two low power shortwave transmitters with the calls CR7RA and CR7RB. The power was also later increased.

In 1968, **Radio Mocidade** (Radio Youth), a station for students, was inaugurated on a low power, medium wave transmitter in Lourenço Marques. It was owned and operated by the Portuguese Youth Organization, and operated on an irregular schedule.

Yet more changes

As part of its nationalistic policy, the government changed the names of various towns in 1976 to reflect the new African rule. Lourenço Marques was renamed Maputo. In 1977, a new interval signal was introduced on Radio Moçambique, consisting of an indigenous musical instrument, the mbira, similar to a xylophone.



In the years following independence, a new guerrilla war was waged between the ruling FRELIMO party and the RENAMO rebels, who were backed by South Africa. Under the strain of war and the exodus of Portuguese nationals, the economy began to crumble. Radio Moçambique introduced an external service, broadcasting for a few hours each day in English to its unsympathetic neighbors—South Africa (still under the rule of apartheid) and what was then Rhodesia.

This service is still on the air, although the new political situation in the entire region has changed the program content. Rhodesia is now Zimbabwe, South Africa has abolished apartheid, FRELIMO and RENAMO signed a truce after many years of warfare.

The beginning of the end?

As with so many third-world countries, broadcasting facilities deteriorated because spare parts were difficult to obtain. Transmitters either broke down or were not operating properly. Some drifted in frequency. I can remember one occasion when one of the Maputo transmitters drifted onto that of another Maputo program, causing interference!

Radio Moçambique, being a public company, has been facing severe financial difficulties recently. One of Radio Moçambique's transmitters in Maputo began carrying the BBC Portuguese service in May 1996. According to a BBC Monitoring report last April, Manuel Veterano, Chairman of the station's board of directors, indicated that 12 out of the 15 shortwave transmitters were off the air. As a result, the domestic service was only audible in the southern part of the country. The financial situation was so bad that unless there was some resolution, the station could be totally off the air at any moment.

Stations that still seem to be active on short wave are:

- Emissora Provincial de Sofala in Beira, officially scheduled at 0200-0500 and 1500-2200 UTC on 3370v, and 0250-2255 on 9637v.
- Emissao Nacional in Maputo, officially scheduled at 0700-1500 on 15291v.
- Emissora Interprovincial de Maputo on 4921.2 from 0250 sign on.

Conclusion

What are the prospects for the future? In 1990, at about the time of the fall of Communism in Europe, the country adopted a new constitution allowing for more individual rights and a multiparty democracy. A general peace accord was signed between RENAMO and FRELIMO, and elections were held in 1994.

For a brief period the future of Mozambique looked bright. But in 1992 a major drought brought work to a standstill. This forced Mozambique to depend heavily on foreign aid. What had once been one of Portugal's richest colonies is now sadly one of the poorest independent countries in Africa—one that no doubt wishes Vasco da Gama had left it "undiscovered."

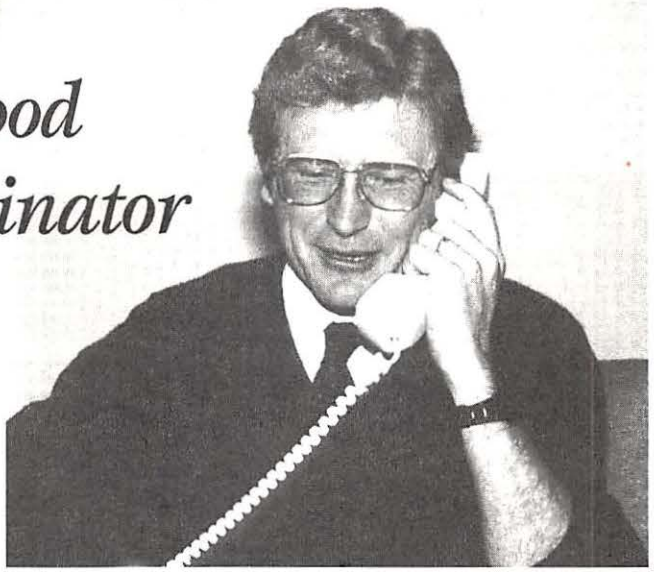
**Moçambique is the Portuguese spelling of the English Mozambique.*

TABLE 1: Stations Operating From Mozambique in 1954

	Call	kHz	kW
CLUBE DE MOÇAMBIQUE, LOURENÇO MARQUES			
Portuguese Network			
	CR7BO	737	0.3
	CR7BK	927	7.5
	CR7BM	3420	7.5
	CR7BV	4829	7.5
	CR7BE	9804	10
	CR7BG	15285	10
English Network			
	CR7BK	927	7.5
	CR7AB	3480	7.5
	CR7BU	4920	7.5
	CR7AA	7254	7.5
	CR7BJ	9762	7.5
	CR7BF	11765	7.5
• EMISSORA DO AEROCLUBE DA BEIRA			
	CR7IB	7258	0.3

10 STEPS

To Becoming a Good Emergency Coordinator



At right, Rich Hanset, KI6EH, Emergency Coordinator for Santa Cruz County contacts members of his team for a training meeting. Above, Susan Tracy, WA6OCV, and Warren Edwards, WD6HDF, participate in a simulated emergency test (SET) under field conditions. Warren operates his 2 meter rig on the tailgate of his station wagon. (Note the umbrella to keep the rain off the equipment and log sheets.)

By Arthur R. Lee WF6P

If you became a ham because you wanted to serve the community, or if you're a member of a public service agency which responds to emergencies, you know the importance of practice and teamwork. But what if there is no team, or no leadership, or too little coordination? Here's some practical advice on helping your community prepare for the worst.

All radio amateurs, whether they realize it or not, are licensed, in part, to act as emergency communicators in time of disaster. Few of us think in terms of actual large-scale emergencies. More common to our fraternity are the countless numbers of smaller emergencies handled daily by licensed amateurs from the ranks of Novice through Extra class. Many of the emergencies are life-saving or potentially life-saving in nature and point up the serious side of the hobby of being a ham. Individual amateur radio operators often play the role of "good neighbor with a radio," just by being able to provide communications when and where none is available.

Unfortunately, grave calamities disrupting the lives of thousands do happen each year throughout the world. Catastrophes such as earthquakes, fires, floods, tornados, and tsunamis occur with regularity. While emergencies of this magnitude may never affect all of us, one could, nevertheless, happen.

(l. To rt.) Preston Rusch, N6ODW, Bruce Wade, W6FKD, and Allan Handforth, KC6VJL, operate the emergency communications van for the ARES group during a demonstration to grade school students.

Communities large enough to have a local amateur radio club are large enough to need more organized communications assistance in time of such major disasters. In most towns and cities, ham organizations are quick to make their presence known to disaster control officials and community leaders. Someone from the ranks of amateur radio operators usually steps forward as a volunteer, or one is appointed by the ham club, and lo, an Emergency Coordinator (EC) is created.

Once a ham has volunteered his services as an EC, it is incumbent upon him or her to work with community organizations in a reliable and professional manner. Dependability, availability, sincerity, and the exercise of common sense are all necessary attributes for any leadership position, especially one dealing with real-life emergency situations.

What are some of the actions to be taken to ensure the success of a good emergency communication program?

Recently, in Santa Cruz, California, a new EC volunteered to share the responsibilities with two other ECs and a District EC for county-wide emergency communications. The EC program needed members, training, organization, and a sense of direction—as in any organization, new energy is often needed to keep the wheel turning. Rich Hanset, KI6EH, himself new to ham radio, volunteered to put a team together for the mid-county area. A severe winter was predicted with more than its share of rainfall. The county had suffered greatly in the past few seasons, both from summer fires and winter floods, so much had to be done in a short period of time.

He immediately found himself working in earnest to build a group of hams into a viable force that could be depended upon in any emergency, large or small. Some of the "old team" had left the area or were working in other aspects of ham radio. Others, untrained or new to ham radio, were eager to learn. In working with his team of amateurs, he found the following 10 steps to be necessary in organizing or reorganizing any such program. While not all-inclusive, they give a prospective EC an idea of what is to be expected.

STEP 1. Have a real desire to be an Emergency Coordinator! It is an important and vital role in volunteer community service. It can be demanding and exciting—but is also fun. Like any job with value, it is worth doing well; the reward is in the "doing."

STEP 2. Read the *EC Handbook* as published by the American Radio Relay League (price $5.00, see below). This new publication is packed full of extremely useful information and prevents wasted time and energy in "reinventing the wheel." However, suggestions for new or better ways of doing things are always welcome and should be forwarded to the ARRL for possible inclusion.

STEP 3. Decide on the type of Amateur Radio Emergency Service (ARES) appropriately for the community. Should it be large? Small? Split into geographic groups? Divided into areas where radio propagation is compatible? (For example, after consideration of all the factors, Santa Cruz County decided to split its organization into three groups they called Sections.)

STEP 4. Establish the purpose, goals and objectives for the group. Set deadlines for achievement of these goals. Make the goals realistic and attainable.

STEP 5. Establish the staff organization. The Designated Assistant Emergency Coordinators (AECs) are the people who will work hardest at putting the organization together.

They include such positions as: Served Agency Coordinator; Operations; Training; Membership; Public Information; Packet Coordinator; Repeater Coordinator; National Traffic System Liaison, and others as necessary. The staff positions will be filled with those persons who show the most interest in emergency communications work, and who will devote the necessary time to "carrying the ball."

Because of their involvement, these members will be the most highly trained and up-to-date ECs, and will normally participate in the administration of the group. The staff will be augmented by the remaining members of the EC group who have volunteered to help, but are not normally available except in case of emergencies.

STEP 6. Recruit members. The general membership of the EC group is the working part of the organization. These are the people who will be called upon for the most work during actual emergencies and stand the bulk of the radio watches in the various locations needing communications. Radio sites may have to be manned on a 24 hour basis at fire stations, hospitals, police stations, aid stations, churches, or public buildings acting as shelters, etc.

STEP 7. Establish classroom and on-the-air net training for staff and members on a regular schedule. Regularity is important. If the training sessions are too far apart, the team will have a natural tendency to drift away from the organization. The training coordinator will have a big job if the group has had no recent emergency communications experience. A strong and interesting training program will go far to familiarize the team with good operating procedures and to eliminate confusion during a time of real emergency.

STEP 8. Establish liaison with local governmental agencies, hospitals, Red Cross, etc. Let them know who you are and that you stand ready to provide a team of *fully trained* and responsible communicators. Present them with telephone numbers of important members, key personnel, etc. Help them decide where and when you can best serve, and in what capacities, and for how long. Some of these agencies may have funds set aside for emergency communications equipment and need help in decision making as to type, etc.

STEP 9. Sustain member and staff interest and enthusiasm. Don't let things get boring. Change the training scenario frequently. Solicit and use the best thoughts of the staff and members to work out better ways of doing things.

Use every talent available to you and make every member feel wanted and important. They are part of the team and their input is important to you and to them. Let the members run the organization while you provide the leadership.

Sometimes it is best to ask, gently but firmly, for members to perform their tasks. Many people need to be asked "personally" before doing anything, then perform beautifully. Learn to work with the various personalities of the members. Some need to be rewarded through recognition more than others. Provide that reward often.

STEP 10. Put it all together. Like the muscles in the human body which atrophy without constant use, exercise the members of the organization. Call staff meetings and ask for regular reports from each staff member. A well-worded request to generate a report will often produce excellent results.

People who have volunteered *expect* to be asked to do something and may even resign if not asked. A member who states, "I volunteered but they didn't need me!" will nullify all of your best efforts.

Ask the staff to make up emergency exercise scenarios, training goals, etc. Ask some to generate routing messages through the National Traffic Service. Initiate some yourself.

Start right away by working on emergency drills. Hold frequent drills, but remember moderation is a key factor in training. Keep the team working as a team.

The author, WF6P, at his home station, passes emergency traffic.

Rich has a few words of advice for prospective ECs. "First of all," says Rich, "don't be afraid to ask for help. The bigger the organization, the more help you will need. People want to be wanted. As soon as they see an organization run as a one man show, they will lose interest. Sure, some may become 'burned out' and resign after awhile, but that gives another person an opportunity to step in and fill the vacancy. There are many valid reasons for people who want to step down. Don't be afraid of personnel turnover."

When asked about final advice for future ECs, Rich said, "Document the structure sufficiently so that others may benefit from what has gone on before them. No organization should be built around a single person; it should be made self-sustaining so that any member can step in and run it."

"Here in Santa Cruz we are in the process of putting together a training manual for local use. It will contain a frequency plan and other helpful 'how-to' information plus local telephone numbers and names. It will be small enough to be carried to the scene of the emergency and used by any communicator. This will help give us some standardization.

"I guess you could think of emergency communications as a business. Our product is communications, our customers are the public, and our profits are the rewards we get in the form of appreciation for a job well done."

For further information on setting up an Emergency Communications unit in your area, contact ARRL Headquarters, 225 Main Street, Newington, CT 06111-1494; phone 860-594-0200/0259 fax.

Note on advertisement below: *As of 4/26/95 it became unlawful to market cellular-capable receivers in the US. Atlantic Ham Radio assures us that it will give a full refund and hold customers harmless from shipping expenses if a purchased unit is returned to the vendor by US Customs.*

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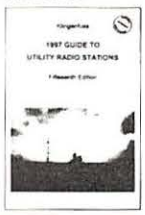

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Data Delivery

Although voice conversations have been the driving force behind the development of cellular and PCS networks, demand for data services is on the rise. Legions of mobile office workers and the explosion of the World Wide Web have created a demand for reliable, high-speed data connectivity, and network operators are fielding a variety of solutions. This month we'll take a look at three data delivery solutions available with current cellular systems in the 800 MHz band.

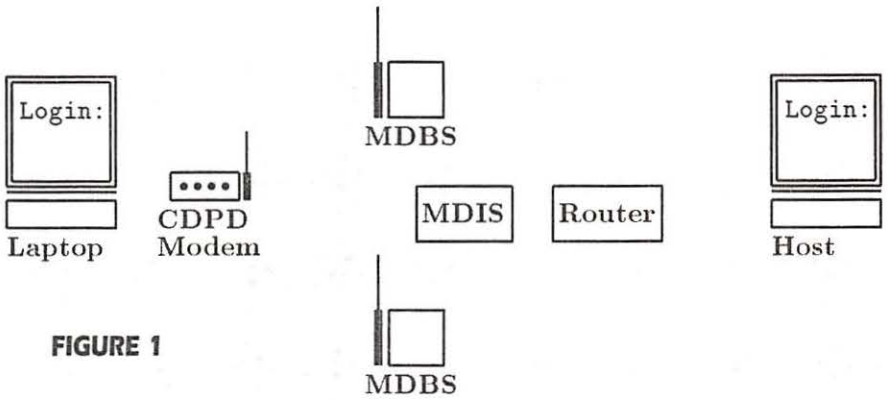


FIGURE 1

Cellular Circuit Switched Data

Just as a landline modem call dedicates a circuit for the duration of the connection, a cellular circuit switched data connection uses a cellular channel for the length of the call. Although the actual channel may change as the mobile user is handed off from one cell site to another, one channel is devoted for the exclusive use of a single data connection. The cellular system doesn't know the difference between a voice call and a data call and provides the same 30 kHz bandwidth channel for data use that would normally carry voice.

In a manner identical to their landline counterparts, cellular modems convert the bits from the computer into analog signals that fit within voice frequencies. These signals are then transmitted just as a cellular telephone would transmit a human voice. Analog signals coming into the modem are converted back into bits and delivered to the computer.

Because data calls suffer from the same audio quality problems that plague voice calls, most current cellular modems incorporate industrial-strength error detection and correction. The two most popular methods are enhanced throughput cellular (ETC), developed by AT&T Network Systems (now Lucent Technologies, Inc.), and microcom networking protocol 10 enhanced cellular (MNP-10EC), from Rockwell International.

ETC-capable modems can send data up to 14,400 bits per second (bps), and a newer version called ETC2 has an advertised speed of up to 20,000 bps. Depending on whom you believe, MNP-10EC is either just as good or somewhat worse than ETC, but each of these protocol enhancements detect and correct errors in the transmitted data, and can dynamically adapt speeds and other parameters to changing environmental conditions. Despite these efforts, however, real-world data transfer rates fall far below the advertised modem speeds due to interference, fading, and other hazards inherent in a mobile radio platform.

A cellular circuit switched data call goes through four phases: setup, where an available cellular channel is found and the call is placed (the number is dialed); handshaking, where the far end modem negotiates with the local modem on speeds and coding methods; session, where data is exchanged; and teardown, where the modems disconnect and the call is terminated. The setup and handshaking time can average 20 to 30 seconds or more, and for small amounts of data this can be a significant portion of the cost of the call.

Cellular circuit switched data has the advantage of being widely deployed and utilizing mostly standard equipment. Almost anywhere a cellular voice call can be placed, circuit switched data may be used, with no additional equipment investment required by the cellular system operator. Drawbacks include lower data transfer speeds and high error rates due to radio link noise and interference. Calls are also billed at the voice rate, which can be rather expensive.

Cellular Digital Packet Data (CDPD)

CDPD optimizes the use of cellular frequencies by transmitting data on idle voice channels. If one of the many voice channels at a cell site is not in use at a particular time, the cellular operator may temporarily transition that channel to CDPD service. If the cell site needs the channel to handle a voice call, it can quickly transition back. In this way the cellular operator need not permanently dedicate a lucrative voice channel to provide data service.

Several new items are required to implement a CDPD network. The mobile CDPD user needs a subscriber unit, consisting of a cellular radio, a modem, and a computer that creates and receives packets. This setup is referred to in "CDPD-speak" as a Mobile End System or M-ES.

In contrast to a standard modem, a CDPD subscriber unit uses the channel only intermittently to transmit short bursts of data, called packets. These packets have a fixed amount of space, called the payload, in which user data may be placed. The packet also contains addressing information that identifies the source and destination of the data. Postcards sent through the mail are a good analogy to packets—each has a destination address, return address, and a place to put a short message.

At each cell site is a mobile data base station (MDBS), which retrieves packets from the M-ES and creates packets to be transmitted back to the mobile unit. The MDBS units are controlled by a mobile

data intermediate system (MD-IS), which routes packets between MDBS sites and other networks, including the Internet. It also keeps track of where a particular M-ES is located so that packets destined for a mobile user are delivered to the appropriate cell site.

Since a subscriber unit does not need to transmit continuously, the selected CDPD channel may be shared by more than one user. CDPD subscriber units listen to the forward channel (cell site to mobile) before transmitting. The forward channel, when being used for CDPD, contains sychronization and timing information for every subscriber within range. It also contains the reverse channel status, whether busy or idle. A CDPD modem with data to send listens to the forward channel and waits for an idle indication. It then transmits a packet on the reverse channel and waits for a status message from the MDBS. If another subscriber unit transmits on the same reverse channel at the same time, the MDBS will report a collision and each subscriber will wait a random amount of time before attempting to retransmit. This is very similar to the method used to send information on Ethernet local area networks. Packets from outside networks destined for a subscriber unit are routed to the nearest MDBS and sent over the forward channel.

CDPD subscriber units are capable of transmitting at up to 19,200 bps, and the equivalent call setup time is only few seconds. This makes CDPD very efficient for sending small amounts of data. Since multiple users share a single CDPD channel, it is also an efficient user of channel capacity for short data packets.

Since CDPD uses only idle voice channels, cellular operators are able to more fully utilize expensive radio equipment and provide data service to users without needing an additional license from the FCC. Operators are hoping that the World Wide Web will be the "killer application" for CDPD, since the short-query longer-response pattern of web access fits CDPD capabilities well. Manufacturers are already producing handheld computers designed to use CDPD and handheld device markup language (HDML, a subset of the common hypertext markup language used on web pages today) to allow mobile users to access the text portion of web pages.

CDPD is currently available in more than 100 markets in the United States, and many providers have interconnection agreements allowing customers to use their CDPD equipment in any of those systems. Since additional expense is required on the part of the cellular operator to install CDPD equipment, it may never be available in some remote or low use cell sites. Also, in some high demand cellular markets such as Los Angeles, CDPD may not be available from some cell sites because all the channels are in continuous use carrying voice calls.

Modem Speeds

Speed (bps)	ITU-T standard
300	V.21
1200	V.22
2400	V.22*bis*
9600	V.32
14400	V.32*bis*
19200	V.32*ter*
28800	V.34

Cellemetry

Not all users need to move large amounts of data. Some applications, such as alarms, meter reading, or package tracking, have only a few bytes of information that need to be moved. BellSouth is promoting a data delivery method to meet such needs called Cellemetry, short for cellular telemetry.

As discussed in the November 1996 column, control channels in a cellular system are devoted exclusively to support functions: locating and paging phones, collecting customer calling information, and registering roaming phones. Since a single control channel can handle more than 30,000 registrations each hour, often these channels are actually carrying data less than ten percent of the time. Cellemetry uses small, inexpensive cellular radios to transmit and receive very short messages on these underused control channels. Cellemetry radios mimick a roaming phone and use a phantom phone number to register and send data.

Cellemetry needs only a single additional piece of equipment, called a gateway, at the mobile telephone switching office (MTSO) to interface the cellemetry network to the radio equipment, allowing data to pass between the cellemetry radios and the customer. The system is also attractive to cellular operators since the entire region is covered from the first day of installation. Cellemetry data is carried on existing equipment and connections between cell sites and the MTSO, and does not interfere with other traffic.

The radios are inexpensive, since less hardware is needed than even a cellular telephone—just the radio portion and a small microprocessor. No speakers, microphones, keypads, or other human interfaces are necessary, and current cellemetry radios are just slightly larger than a thick credit card.

In a typical installation, a cellemetry radio is installed in a vending machine and transmits when the machine is running low on supplies or needs more change. The vending machine owner may also query the machine to get status information. Since the amount of data to be transmitted is very small and the cost of the equipment is minimal, cellemetry may be an attractive option for those who would otherwise be unable to afford wireless data connectivity.

Which to Use?

Which cellular data solution to use depends on the application and the amount of data to be sent. Circuit switched cellular data calls are billed by the minute, just like voice calls, and are generally better for sending amounts of data greater than about 2 kilobytes. Cellular digital packet data, where it is available, is billed according to how much data was transferred, not how long it took. CDPD is almost always cheaper for amounts of data under 2 kilobytes. This threshold is subject to change, of course, as cellular operators change pricing strategies and compete for business.

Speaking of competition, cellular is not the only solution for mobile data connectivity. Several other frequency spectrum users offer data services, and we'll take a look at some of them in future columns. Until then, comments and questions are welcome at **dan@decode.com**, and more information is available on the Grove Web Server at **http://www.grove.net/~dan**. Happy monitoring!

Richard Barnett
ScanMaster@aol.com, Compuserve at 102354,3643

Massachusetts Police Monitoring

What does the crystal ball say about scanning in 1997? Here, in the not too remote outpost of Massachusetts, scanning has never been better. The Boston Police are operating on their 460 MHz system, all in clear voice, with the exception of a couple of digitally scrambled channels for detectives and vice squads.

Police departments in eastern Massachusetts from the New Hampshire border to Rhode Island (with the exception of Cape Cod), operate almost entirely on powerful UHF repeater systems. If you're centrally located in Boston or just to the west, you can monitor police mobiles and portables in a 50-or-so-mile radius on these UHF systems. The scanning is easy, and, particularly with Boston Police, the action is non-stop. (The Boston Police, with their powerful transmitters, can be monitored from southern Maine, central New Hampshire, and even eastern Connecticut!)

The only fly in the ointment today for police buffs in eastern Massachusetts is the State Police system. This is an 800 MHz trunked system which is expanding around the Commonwealth and is shared by numerous state agencies: the Massachusetts Water Resources Authority (MWRA), the Convention Center, the Parole Board, Central Artery Construction Project units, Sheriffs' Departments, Parks units, public works trucks, and others. Most troubling for listeners is that the MWRA utilizes talkgroups on the system to transmit water meter data. Listeners hear a constant drone of beeeep, braaap, beeeep. We have also been told that the skating rinks around Boston, which had had problems with the emissions from zambonis, are also transmitting data on the air quality inside the rinks. You got it: more beeeeps and braaaps for your monitoring pleasure.

With trunked systems, of course, these talkgroups can show up on practically any one of the 20 channels used in the eastern Massachusetts State Police trunking system. The data groups trunk randomly among the frequencies, just like a voice talkgroup does. Data groups make a lot of sense for the system users, as they save a great deal of money on charges for telephone lines, which often are used to transmit data. The Massachusetts trunked system, which was developed primarily for the Metropolitan District Commission police force (an agency which was later merged into the State Police), works extremely well. For scanner users, however, trying to catch conversations as they jump channels between replies becomes even more frustrating as your scanner constantly lands on data group after data group.

The new TrunkTracker scanners from Uniden will resolve these problems for most scanner listeners. The TrunkTrackers will allow you to not only follow one or more selected conversations, it will allow you to lock out data groups, or other unwanted groups, while in the group search mode. Using this feature, TrunkTracker users can ensure all they hear are the voice transmissions.

Trunk lockout and user-selectable group scan, are great features. Now, with the TrunkTracker, the remaining obstacles to scanning in eastern Massachusetts are removed, and listening was never better. Check out the cover story on the new TrunkTrackers by Uniden in this issue for more details on this new breakthrough in scanner engineering.

Uniden's new "Trunk Trackers," the BC235XLT at left and the BC895XLT below, are causing ripples of excitement in the scanner industry. More information about the new units is available in the Grove Buyer's Guide insert in this issue of MT.

ICOM R-10 Due on the Shelf

You've seen the first advertisements for the new ICOM R-10 portable scanner, and a review by Bob Parnass appears in this issue. This radio will be an aggressive challenger to the dominance of the other high-end portable, the AOR AR-8000. With an alpha-numeric display (an extremely useful feature we'll discuss at length in a later article), computer control, wide-band coverage, and more, this looks to be an exciting radio, due in late February.

The radio is expected to be priced near the AR-8000, which sells in the $600 range. This begs the question, "What is the market for such high-priced gear?" The new ICOM 8500 and the AOR AR-5000 both hover in the $2,000 range. These are both incredible receivers, and certainly they have useful military and government applications. How many of us regular folk have the kind of money to afford such luxuries, particularly if we already own an R-7000, 7100, AR-8000, etc.? We're very glad ICOM and AOR have made the commitment to address the high-end with such wonderful gear. We are equally thankful, though, that

manufacturers such as Uniden, Radio Shack/GRE, and now RELM continue to service the low-end, mid-range, and the underside of the high-end market with scanners, too.

Storytelling with Frequencies

Temple T. Berdan posted the following story online, entitled, "Wild, wild west." We reprint it with Mr. Berdan's permission, to demonstrate how you can utilize your scanner and your frequency knowledge to enjoy on-air action. We encourage our readers to submit their monitoring stories, and frequencies, as well.

"Howdy. I'm over in the Sedona, AZ, area (120 miles north of Phoenix and 30 miles south of Flagstaff), enjoying what I thought would be a nice relaxing Christmas season and some boring little-town scanning. Wrong!

"FRIDAY: Local Bank of America was held up. One robber made a clean get-away. Strange thing, as there are not very many roads/interstates into this area. Seems the robber made everyone hit the deck, so no good description of get-away vehicle was obtained. Sedona police: 158.760 MHz.

"SATURDAY: A beautiful day to go house-hunting in the village of Oak Creek (where we're staying)... right? Wrong. Seems a local realtor went to show a beautiful 3,000 square foot house. As he and his clients entered the house they saw a pair of feet sticking out of a doorway. There was the owner (the house had a lockbox on it) who had been shot one time in the head....several days before. No weapon, nothing disturbed. Local radio says there are few clues. Yavapai CountySheriff: 154.740 MHz. Yavapai County Sheriff's Office detectives: 169.675 MHz (doing most of it on cell/land line phones).

"SUNDAY: Coconino County Sheriff Dispatcher (Flagstaff/Grand Canyon areas): Officer down! Suspects leaving scene! Seems that some folks in a one horse town halfway between Flagstaff and the Canyon had had some sort of dispute, and the solo sheriff's officer (SO) had stepped into a hornets' nest with one of the parties involved shooting the SO. And he (the SO) shot back, wounding the bad guy in the arm (they said blood was all over the crime scene). SO in hospital, okay after the operation.

"Immediately the dispatcher issued the standard officer down call for help and over ten SO and Arizona Department of Public Safety (DPS, elsewhere known as Highway Patrol) units came from as far as 75 miles away. They also scrambled a DPS Jet Ranger chopper that played a key role in what transpired next. For the next two hours the chopper searched the areas paved highway and local dirt roads (they call them single and two-track roads).

"Finally, they found the get-away van near a group of people cutting old timber from last summer's forest fires. They started waving madly at the chopper, who directed a unit to the scene. Seems the bad guys had hijacked one of the woodcutters' trucks, and a new search was on. The chopper and the ten ground units started methodically going from ranch to ranch (this was now out of forest and in open-range high-desert Colorado Plateau country).

"Hour two passed and suddenly the chopper spotted the truck at the ranch right next door to Secretary of Interior Bruce Babbit's ranch. And there was a guy standing out in front with a rifle. Almost all of the units (excluding those at main road block and the original crime scene officer who was on the way to Flag Hospital), were directed to ranch. The truck fit the description perfectly..... except that the front brushbar was not bent under. And the guy with the rifle was too old to be one of the bad guys. Bad lead. The search was back on.... with only about 45 minutes of daylight left.

"Almost immediately the chopper spotted the hijacked truck and dropped down so they could see him. The nearest ground unit was now 20 minutes away and the chopper was told to stay away as he was liable to get shot at. The chopper could see the ground units coming (he was watching their dust trails) and they were now about five minutes away. Suddenly, the bad guys' truck stopped and the wounded passenger was rolled out into the roadside ditch, where he lay in the prone position. The driver then must have seen the dust trails coming, as he took off across country. For the next 30 minutes the chopper trailed the truck (which was heading for the edge of the forest) and directed the only two four wheel drive units as to where the truck was going. He also must have become very concerned, as he was losing daylight, with the sun about to go down over the rim.

"On several occasions, the bad guy had to circle around, stop, get out and look to see where he was. He obviously didn't know the terrain. Finally, he entered the edge of the forest, only to be greeted by the two 4wd units and one DPS 2wd unit (I'd sure like to see what kind of shape it is in!). Suspect in custody! Code 4. Now they had three different crime scenes, one of which was really in the boonies. And it seemed that those on scene didn't know where they were (they had received all of their directions from the chopper). Finally, the chopper went back and gave them a GPS reading.

"Interagency communications were not on CLEMARS or NALEMARS. (Editor's note: CLEMARS and NALEMARS are California channel references. CLEMARS, California Law Enforcement Mutual Aid Radio System, is 154.920 MHz. NALEMARS, National Law Enforcement Mutual Aid Radio System, is 155.475 MHz, which is used in Arizona and in much of the United States.) Nor were they always

on direct. Some were from the DPS dispatcher to the Sheriff's Office dispatcher. But in most cases, units communicated by using their regular frequencies and by listening to each other on their scanners. Those units without scanners had to go through their dispatchers, which was awkward at best. Coconini County Sheriff: 155.490.

"P.S. Interestingly enough, all of the above action was taking place at least 60 miles away from my location, with a 12,000 foot mountain in between. There must be a very good repeater system here, as I'm only using a makeshift 18 inch stripped end of a 10 foot piece of RG58 hanging from a window drape and hooked into a Radio Shack TV preamp."

Favorite Scanner and Favorite Scanner Feature

A few months back we asked you to write us about your favorite scanner. We were not really interested in which of your scanners had the most features and was the most expensive, but rather which scanner had the greatest impact on you and your growth in the hobby. Unfortunately, we received only a few responses to our request.

Perhaps there are more intriguing questions. Here are a couple which quickly come to mind:

What scanner feature (other than the basic features) do you most enjoy and make use of? Some may answer CTCSS (and DCS) operation, or perhaps select-scan, which is found in high-end radios. Which is it for you?

The second question is probably more important. What scanner features do you most desire? Are there features on the high-end models that you would like to see in the mid-range units? Or, are there features you've never seen that you feel should be included in future scanners? If so, how exactly would these features work?

Give these questions some thought and send your responses by regular mail to me, Rich Barnett, care of the *Monitoring Times* offices. You can also e-mail me at **Scanmaster@aol.com**. If we receive some interesting suggestions, we will present them to one or more of the scanner manufacturers for their consideration.

Police Call Plus 1997

The new *Police Call Plus* for 1997 is now on sale. As it is every year, the new edition is completely updated and includes more channel usage information than ever before. All public safety, local government, and special emergency frequencies are coherently presented, by state, in user order. Frequencies are changing very fast around the country and *Police Call* is always the most up-to-date directory that is on the market.

The front section of *Police Call Plus*, known as the Listener's Guide Book, contains, in my view, the single most informative introduction to two-way radio systems and scanner monitoring ever written. Covering radio, from the basics to future technologies, this section has it all: skip, frequency range theory, frequency mixing, the upcoming co-channel utilization schemes, antenna systems, coax cable, vehicle location mapping, a detailed discussion of trunked systems, and much more.

One of the most popular sections of *Police Call* has always been the Listings by Frequency chapter. Here you will find all the public safety, local government, and special emergency frequencies for each particular region listed in frequency sequence. This is an invaluable resource for distance (DX) monitoring.

The Consolidated Frequency List, which charts the FCC designated use of all frequencies from 25 MHz to 1 GHz, is equally invaluable. Sections that have been added over the past few years include system maps and 10-code listings for major agencies.

The *Police Call Plus/Beyond Police Call* section, edited by yours truly, offers selected business data presented in a completely unique way. Because there are so many hundreds of thousands of business licenses—far more than ever could be included in a nine-volume set—we've culled out what we consider to be the most interesting and valuable records, as follows:

- Alarm companies
- Buses
- Colleges and Universities
- Country Clubs
- Farm Cooperatives
- Limousines
- Movie crews
- Newspapers
- Public utilities (electric, gas, telephone)
- Railroads
- School districts
- Sports events
- State fairs
- Towing
- Amusement parks
- Casinos
- Conventions
- Entertainers
- Hotels and motels
- Mall security
- Neighborhood watch
- Private investigators
- Race crews (drivers, pits, and stadiums)
- Resorts
- Ski areas
- Stadiums
- Taxis

Practically every non-public safety FCC license in the nation was reviewed and considered for possible inclusion in the *Beyond Police Call* chapter. Then, thousands of records were "cleaned" to make the presentation consistent throughout each state. Lots of work goes on behind the scenes in order to make all of *Police Call* easy-to-use and well worth its price.

Besides all the great information, what makes *Police Call Plus* so terrific is that it's like an old friend. It comes out every year and reliably sits at your scanner's side as you monitor from season to season. It's the least expensive scanner guide, but it packs more data than almost every other book on the market. It's even easy to find at all Radio Shack stores, by mail-order through Grove and almost all other mail order distributors.

Perhaps best of all, though, coming out every year as it does, *Police Call* helps to define and validate our hobby as long-standing, important, but still just plain fun.

Synthesized FM Stereo Transmitter

Microprocessor controlled for easy freq programming using DIP switches, no drift, your signal is rock solid all the time - just like the commercial stations. Audio quality is excellent, connect to the line output of any CD player, tape deck or mike mixer and you're on-the-air. Foreign buyers will appreciate the high power output capability of the FM-25; many Caribbean folks use a single FM-25 to cover the whole island! New, improved, clean and hum-free runs on either 12 VDC or 120 VAC. Kit comes complete with case set, whip antenna, 120 VAC power adapter - easy one evening assembly.

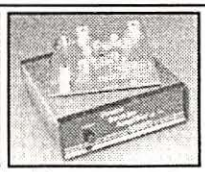
FM-25, Synthesized FM Stereo Transmitter Kit $129.95

Tunable FM Stereo Transmitter

A lower cost alternative to our high performance transmitters. Offers great value, tunable over the 88-108 MHz FM broadcast band, plenty of power and our manual goes into great detail outlining aspects of antennas, transmitting range and the FCC rules and regulations. Connects to any cassette deck, CD player or mixer and you're on-the-air, you'll be amazed at the exceptional audio quality! Runs on internal 9V battery or external power from 5 to 15 VDC, or optional 120 VAC adapter. Add our matching case and whip antenna set for a nice finished look.

FM-10A, Tunable FM Stereo Transmitter Kit $34.95
CFM, Matching Case and Antenna Set. $14.95

RF Power Booster Amplifier



Add some serious muscle to your signal, boost power up to 1 watt over a frequency range of 100 KHz to over 1000 MHz! Use as a lab amp for signal generators, plus many foreign users employ the LPA-1 to boost the power of their FM Stereo transmitters, providing radio service through an entire town. Power required: 12 to 15 volts DC at 250mA, gain of 38dB at 10 MHz, 10 dB at 1000 MHz. For a neat, professionally finished look, add the optional matching case set.

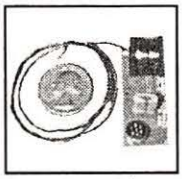
LPA-1, Power Booster Amplifier Kit $39.95
CLPA, Matching Case Set for LPA-1 Kit. $14.95
LPA-1WT, Fully Wired LPA-1 with Case $99.95

Micro FM Wireless Mike

World's smallest FM transmitter. Size of a sugar cube! Uses SMT (Surface Mount Technology) devices and mini electret condenser microphone, even the battery is included. We give you two complete sets of SMT parts to allow for any errors or mishaps-build it carefully and you've got extra SMT parts to build another! Audio quality and pick-up is unbelievable, transmission range up to 300 feet, tunable to anywhere in standard FM band 88 to108 MHz. 7/8"w x 3/8"h x 3/4"h.

FM-5 Micro FM Wireless Mike Kit $19.95

Crystal Controlled Wireless Mike



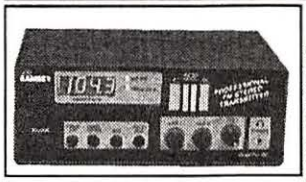
Super stable, drift free, not affected by temperature, metal or your body! Frequency is set by a crystal in the 2 meter Ham band of 146.535 MHz, easily picked up on any scanner radio or 2 meter rig. Changing the crystal to put frequency anywhere in the 140 to 160 MHz range-crystals cost only five or six dollars. Sensitive electret condensor mike picks up whispers anywhere in a room and transmit up to 1/4 mile. Powered by 3 volt Lithium or pair of watch batteries which are included. Uses the latest in SMT surface mount parts and we even include a few extras in case you sneeze and loose a part!

FM-6, Crystal Controlled FM Wireless Mike Kit $39.95
FM-6WT Fully Wired FM-6 ..... $69.95

Call for our Free Catalog !

RAMSEY

Super Pro FM Stereo Radio Transmitter

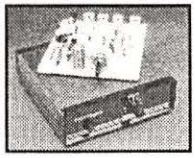


A truly professional frequency synthesized FM Stereo transmitter station in one easy to use, handsome cabinet. Most radio stations require a whole equipment rack to hold all the features we've packed into the FM-100. Set frequency easily with the Up/Down freq buttons and the big LED digital display. Plus there's input low pass filtering that gives great sound no matter what the source (no more squeals or swishing sounds from cheap CD player inputs!) Peak limiters for maximum 'punch' in your audio - without over modulation, LED bargraph meters for easy setting of audio levels and a built-in mixer with mike and line level inputs. Churches, drive-ins, schools and colleges find the FM-100 to be the answer to their transmitting needs, you will too. No one offers all these features at this price! Kit includes sharp looking metal cabinet, whip antenna and 120 volt AC adapter. Also runs on 12 volts DC.

We also offer a high power export version of the FM-100 that's fully assembled with one watt of RF power, for miles of program coverage. The export version can only be shipped outside the USA, or within the US if accompanied by a signed statement that the unit will be exported.

FM-100, Professional FM Stereo Transmitter Kit $299.95
FM-100WT, Fully Wired High Power FM-100. ..... $429.95

Speech Descrambler Scrambler



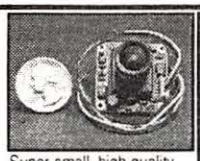
Decode all that gibberish! This is the popular descrambler / scrambler that you've read about in all the Scanner and Electronic magazines. The technology used is known as speech inversion which is compatible with most cordless phones and many police department systems, hook it up to scanner speaker terminals and you're in business. Easily configured for any use: mike, line level and speaker output/inputs are provided. Also communicate in total privacy over telephone or radio, full duplex operation - scramble and unscramble at the same time. Easy to build, all complex circuitry contained in new custom ASIC chip for clear, clean audio. Runs on 9 to 15VDC, RCA phono type jacks. Our matching case set adds a super nice professional look to your kit.

SS-70A, Speech Descrambler/Scrambler Kit $39.95
CSS, Custom Matching Case and Knob Set $14.95
SS-70AWT, Fully Wired SS-70A with Case $79.95
AC12-5, 12 Volt DC Wall Plug Adapter $9.95

Tone-Grabber Touch Tone Decoder / Reader

Dialed phone numbers, repeater codes, control codes, anywhere touch-tones are used, your TG-1 will decode and store any number it hears. A simple hook-up to any radio speaker or phone line is all that is required, and since the TG-1 uses a central office quality decoder and microprocessor, it will decode digits at virtually any speed! A 256 digit non-volatile memory stores numbers for 100 years - even with the power turned off, and an 8 digit LED display allows you to scroll through anywhere in memory. To make it easy to pick out numbers and codes, a dash is inserted between any group or set of numbers that were decoded more than 2 seconds apart. The TG-1 runs from any 7 to 15 volt DC power source and is both voltage regulated and crystal controlled for the ultimate in stability. For stand-alone use add our matching case set for a clean, professionally finished project. We have a TG-1 connected up here at the Ramsey factory on the FM radio. It's fun to see the phone numbers that are dialed on the morning radio show! Although the TG-1 requires less than an evening to assemble (and is fun to build, too!), we offer the TG-1 fully wired and tested in matching case for a special price.

TG-1, Tone Grabber Kit. $99.95
CTG, Matching Case Set for TG-1 Kit. $14.95
TG-1WT, Fully Wired Tone Grabber with Case $149.95
AC12-5, 12 Volt DC Wall Plug Adapter $9.95

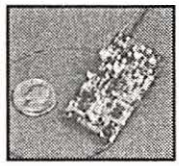


Mini-Peeper Micro Video Camera

Super small, high quality fully assembled B & W CCD TV camera the size of an ice cube! Provides excellent pictures in low light (2 lux), or use our IR-1 Infra-Red light source to invisibly illuminate an entire room on a pitch black night! Imagine the possibilities... build it into a smoke detector, wall clock, lamp, book, radio. Exact same camera that's in big buck detective catalogues and stores. Kit includes: fully assembled CCD camera module, connectors, interface PC board kit with proper voltage regulation and filtering, hook-up details, even a mini microphone for sensitive sound! Two models available: Wide Angle Lens 3.6mm/f2, adjustable focus lens, 92 degree view; Pinhole Lens 5.5mm/f4.5, 60 degree view. The Pinhole Lens is physically much flatter and provides even greater depth of focus. The camera itself is 1.2" square. The Wide Angle Lens is about 1" long, Pinhole Lens about 1/2", interface PC board is 1" x 2" and uses RCA jacks for easy hook-up to VCRs, TVs or cable runs. Power required is 9 to 14 VDC @ 150 mA. Resolution: 380 x 350 lines. Instruction manual contains ideas on mounting and disguising the Mini-Peeper along with info on adding one of our TV Transmitter kits (such as the MTV-7 unit below) for wireless transmission!

MP-1, Wide Angle Lens CCD TV Camera Outfit $169.95
MP-1PH, Pin-Hole Lens CCD TV Camera Outfit $189.95

MicroStation Synthesized UHF TV Transmitter



Now you can be in the same league as James Bond. This transmitter is so small that it can fit into a pack of cigarettes - even including a CCD TV camera and battery! Model airplane enthusiasts put the MTV-7A into airplanes for a dynamite view from the cockpit, and the MTV-7A is the transmitter of choice for balloon launches. Transmitter features synthesized, crystal controlled operation for drift-free transmission of both audio and video on your choice of frequencies: Standard UHF TV Channel 52 (which should only be used outside of the USA to avoid violating FCC rules), and 439.25 MHz or 911.25 MHz which are in the amateur ham bands. The 439.25 MHz unit has the nifty advantage of being able to be received on a regular 'cable-ready' TV set tuned to Cable channel 68, or use our ATV-74 converter and receive it on regular TV channel 3. The 911.25 MHz unit is suited for applications where reception on a regular TV is not desired, an ATV-79 must be used for operation. The MTV-7A's output power is almost 100 mW, so transmitting range is pretty much 'line-of-sight' which can mean many miles! The MTV-7A accepts standard black and white or color video and has its own, on-board, sensitive electret micorphone. The MTV-7A is available in kit form or fully wired and tested. Since the latest in SMT (Surface Mount Technology) is used to provide for the smallest possible size, the kit version is recommended for experienced builders only. Runs on 12 VDC @ 150 mA and includes a regulated power source for a CCD camera.

MTV-7A, UHF TV Channel 52 Transmitter Kit $159.95
MTV-7AWT, Fully Wired Channel 52 Transmitter $249.95
MTV-7A4, 439.25 MHz TV Transmitter Kit $159.95
MTV-7A4WT, Fully Wired 439.25 MHz Transmitter $249.95
MTV-7A9, 911.25 MHz TV Transmitter Kit $179.95
MTV-7A9WT, Fully Wired 911.25 MHz Transmitter $269.95
ATV-74, 439.25 MHz Converter Kit $159.95
ATV-74WT, Fully Wired 439.25 MHz Converter $249.95
ATV-79, 911.25 MHz Converter Kit $179.95
ATV-79WT, Fully Wired 911.25 MHz Converter $269.95

RAMSEY ELECTRONICS, INC.
793 Canning Parkway
Victor, NY 14564

Order Toll-free: 1-800-446-2295
Sorry, no tech info or order status at this number

Technical Info, Order Status
Call Factory direct: (716) 924-4560

VISA MasterCard DISCOVER

ORDERING INFO: Satisfaction Guaranteed. Examine for 10 days, if not pleased, return in original form for refund. Add $4.95 for shipping, handling and insurance. Orders under $20, add $3.00. NY residents add 7% sales tax. Sorry, no CODs. Foreign orders, add 20% for surface mail or use credit card and specify shipping method.

Larry Van Horn, N5FPW
steditor@grove.net

In Honor of the Guard

"A relevant force...missioned across the spectrum of contingencies...structured and resourced to accomplish its missions...capable and accessible when called...with trained citizen-soldiers committed to preserving the timeless traditions and values of service to our nation and communities."

(Vision statement of the U.S. Army National Guard)

How many times have you heard on the news during a natural disaster that the governor of a particular state has activated the National Guard to help in recovery? If you are like me, you probably have wondered if it was possible to dial in on the action even though you might not live within VHF or UHF range.

The answer to that question is a resounding yes.

Heritage of The Army National Guard

The Army National Guard is America's oldest military organization, tracing its heritage to the first militia units organized in the Massachusetts Bay Colony on Dec. 13, 1636. The National Guard was founded on the tradition that it is both a privilege and a responsibility for able-bodied citizens to bear arms for the common defense of their community and nation. Since its inception, Army Guard citizen-soldiers have fought in every American war from the Pequot War of 1637 to Operation Desert Storm in 1991.

Today, the Army National Guard is authorized 387,000 soldiers in units located in 2,700 communities throughout all 50 states, Puerto Rico, Guam, the Virgin Islands and the District of Columbia. It operates 3,360 installations to support training, aviation, administration, and logistics to maintain the National Guard's readiness and presence throughout the United States and its territories.

Roles and Missions

The National Guard's primary federal mission is to maintain properly trained and equipped units available for prompt mobilization for war, national emergency, or as otherwise needed. Its state mission is to provide trained and disciplined forces for domestic emergencies or as otherwise required by state law. This dual-status role was established by the U.S. Constitution. Throughout this century, the external and internal roles of the Guard have been further clarified and restated by the Congress based on the concept that America's citizens can and will mobilize for the common defense.

To meet these missions, the Army National Guard is structured to support both international and domestic requirements. At the federal level, the Guard provides decisive land power for major war and essential combat support, and provides service support units for contingency operations. At the state and community level, the Guard contributes a return on this federal investment through the domestic support capabilities embedded in its units.

TABLE 1: National Guard Nationwide/Statewide Admin Frequencies

4001.5	Missouri	5062.0	Puerto Rico
4035.0	Louisiana	5087.0	Wisconsin
4240.0	South Carolina	5203.5	North Carolina
4244.5	Tennessee	5205.0	Florida/Colorado
4250.0	Georgia	5215.5	Virginia
4296.0	Iowa	5432.5	New York
4445.0	Michigan	5821.5	Texas
4520.0	New Jersey (Net Fridays at 1400Z)/South Dakota	6010.0	Kentucky
		6910.5	Rhode Island
4555.0	New Mexico	6992.0	Arizona
4580.0	Washington	7361.0	Ohio
4607.0	Nebraska	8038.5	Delaware
4608.5	New Hampshire	8047.0	Virginia
4610.0	Illinois	8056.0	North Dakota/Wyoming
4780.0	District of Colombia/Indiana	8057.5	Vermont
		8180.0	Oregon
4860.0	Idaho	8622.0	Alabama
4867.0	Maryland	9357.0	Hawaii
4927.5	Oklahoma	13722.0	NG Nationwide primary
4960.0	Mississippi	14653.0	NG Nationwide
5045.0	Montana	20906.0	NG Nationwide

The Guard and HF

The Guard does use the HF spectrum for communications. Table 1 is a list of known state administrative frequencies and nationwide frequency allocations. Communication normally is in either USB or LSB. Table 2 is a complete list of National Guard state/national headquarter callsigns that the listener might hear on the HF networks.

Unless a particular unit has been activated, you might not hear much activity during the week. However, since the Guard is composed of citizen-soldiers, listeners should find these frequencies more active during drill weekends at National Guard sites.

These frequencies will also be active when these units perform their two weeks of active duty each year. Of course, when units have been activated for an emergency, any of these frequencies are possible targets for listening in on the drama.

TABLE 2: U.S. Army National Guard Callsigns

AAB1CT	Hartford, CT	AAC2NC	Raleigh, NC
AAB1DC	Washington, DC	AAC2PR	San Juan, PR
AAB1DE	Wilmington, DE	AAC2SC	Columbia, SC
AAB1IA	Johnston, IA	AAC2TN	Nashville, TN
AAB1IL	Springfield, IL	AAC2VI	St. Croix, VI
AAB1IN	Indianapolis, IN	AAF5AR	North Little Rock, AR
AAB1MA	Reading, MA	AAF5KS	Topeka, KS
AAB1MD	Baltimore, MD	AAF5LA	New Orleans, LA
AAB1ME	Augusta, ME	AAF5MO	Jefferson City, MO
AAB1MI	Lansing, MI	AAF5NE	Lincoln, NE
AAB1MN	St. Paul, MN	AAF5OK	Oklahoma City, OK
AAB1NH	Concord, NH	AAF5TX	Austin, TX
AAB1NJ	Trenton, NJ	AAW5NM	Santa Fe, NM
AAB1NY	Latham, NY	AAG6CA	Sacramento, CA
AAB1OH	Columbus, OH	AAG6CO	Golden, CO
AAB1PA	Annville, PA	AAG6ID	Boise, ID
AAB1RI	Providence, RI	AAG6MT	Helena, MT
AAB1VA	Richmond, VA	AAG6ND	Bismark, ND
AAB1VT	Winooski, VT	AAG6NV	Carson City, NV
AAB1WI	Madison, WI	AAG6OR	Salem, OR
AAB1WV	Charleston, WV	AAG6SD	Rapid City, SD
AAB1NGB	Arlington, VA	AAG6UT	Draper, UT
AAC2AL	Montgomery, AL	AAG6WY	Cheyenne, WY
AAC2FL	St. Augustine, FL	AAH6WA	Tacoma, WA
AAC2GA	Atlanta, GA	AAZ6AZ	Phoenix, AZ
AAC2KY	Frankfort, KY	ABJ7GU	Tamuning, Guam
AACMS	Jackson, MS	ABJ7HI	Honolulu, HI

And then there is Texas

Texas military forces trace their history to the "Texian" revolutionary militia which helped create what is now Texas. The Texas National Guard has actively participated in every major American conflict and emergency. From the first cannon shot fired at the Battle of Gonzales in 1835 to the liberation of Kuwait in 1991, Texas men and women in uniform have served with distinction. Today, Texas military forces are comprised of three military organizations: Army National Guard, Air National Guard, and the Texas State Guard.

Texas State Guard

The State Guard is composed of a headquarters and nine military police groups consisting of 20 battalions. The size and structure of the Texas State Guard are determined and directed by the Governor, through the Adjutant General. There are 70 companies collocated with Army National Guard units throughout the State. Texas State Guard soldiers are volunteers between the ages of 17 and 60, and train a minimum of eight hours each month. All serve without pay.

New Texas Guard soldiers are provided basic field uniforms at a nominal cost from their regiment of assignment. Individual equipment items such as web belts, canteens, ponchos, and helmet liners are issued. Uniform accessories or dress uniforms must be purchased by the member. Personal vehicles are used for all training and operational transport requirements.

This unique unit has its own frequencies separate from the regular Army National Guard units in the state. Table 3 list all the known frequencies and callsigns that have been discovered to date.

Updates to the National Guard and Texas State Guard are welcomed. You can address this information to the e-mail or snail mail addresses in the masthead.

TABLE 3: Texas State Guard

2710 4440 4520 5214 5820 7360 8160

A6J	Lubbock	N1B	McAllen
B6P	Amarillo	S2A	Port Arthur
B8E	San Angelo	S2F	Ft. Worth
D0V	El Paso	V4S	Abilene
E7X	San Antonio	W8D	Corpus Christi
G6O	Dallas	W8P	Ft. Worth
K0W	Wichita Falls	W9D	Corpus Christi
M6R	Dallas	X3O	Bastrop
M9B	Waco	Z6I	Austin

And Finally...

I recently monitored an old friend on HF that I have not heard or seen reported in quite some time. USAF station Acrobat located at Davidsonville, Maryland (Andrews AFB), made a rare voice appearance on a frequency (a new one to me) of 6798 kHz in upper sideband (USB). Acrobat was working a with the station callsign Punisher. The operator at Acrobat identified his frequency as Alpha two (6798), and mentioned that Punisher was on a frequency with the designator Bravo two (not found). These stations were establishing a loopback circuit for the long haul HF Defense Communications System or DCS.

The following day Rick Baker called me to tell me he had found Acrobat up again, talking to Punisher on 7690 kHz (USB).

I have followed Acrobat closely for several years now, and while the DCS system is being phased out in lieu of satellites, once in a great while I still receive reports from monitors intercepting communications from Acrobat.

Here are some of the other reports I have received over the years regarding this station.

6753.0 ... USAF Acrobat working Butter, QTY from 6830.0 (LSB)
6830.0 ... USAF Acrobat working Butter, QTY to 6753.0 (LSB)
6910.0 ... Yoglund (?) working Acrobat "transmitting on E3 and receiving on F2." (USB)
7921.0 ... Goldbloom calling Acrobat on channel Alpha 7. (USB)
8055.0 ... Acrobat working Declination setting up duplex voice/data circuits on the following frequency combinations: 8055.0(*?)/ 6910.0 (Alpha 5?); 8055.0(*?)/ ? (Alpha 03); 8055.0 (*?)/ 9190.1 (Alpha 08). (* Indicates designator is probably an Alpha or Bravo designator). Acrobat mentioned, "you send out, we receive, then send out to Albany." (LSB)
9101.1 ... USAF Acquire working Acrobat, QST Mike 3, mentioned Mike 4 (LSB)
9145.0 ... Acrobat telling W4P that the callsign format for their data transmission was wrong. Callsign, with an extra A, was relayed as ARAT UZ YUW. (LSB)
9190.1 ... Acquire working Acrobat, changed frequency to Mike 3 and mentioned Mike 4 (LSB)
10905.0 .. Acrobat calling Zulu (LSB)
12056.5 .. Day Letter (USAF) attempting to contact Acrobat (LSB)

In addition to the frequencies mentioned above, monitors might also want to watch the following frequencies for DCS operations: 4751.5, 4845, 6909, 6989, 7425, 7835, 8041, 10648, 10665, 11410, 11535, 16090, and 17460 kHz. I would like to thank Jeff Jones, Jack Metcalfe, Harry Riddell, and Peter Stanwicki for supplying the intercepts above.

Now it is time to see what you have been hearing this month in the Utility World.

Utility Loggings

Larry Van Horn

Abbreviations used in this column

AFB	Air Force Base
ALE	Automatic Link Establishment
ANDVT	Advanced Narrowband Digital Voice Terminal
AT&T	American Telephone and Telegraph
CW	Continuous Wave (Morse code)
Diplo	Diplomatic
DSN	Defense Switch Network
EAM	Emergency Action Message
EOC	Emergency Operations Center
FAA	Federal Aviation Administration
FEC-A	Forward Error Coreection
FEMA	Federal Emergency Management Agency
GHFS	Global HF System
HF	High Frequency
ID	Identification
LDOC	Long Distance Operational Control
LSB	Lower Sideband
MARAD	U.S. Maritime Administration
MFA	Ministry of Foreign Affairs
MOI	Ministry of Information
MWARA	Major World Air Route Area
NAS	Naval Air Station
NECN	National Emergency Coordination Network
NS/EP	National Security/ Emergency Preparedness
NTA	National Telecommunications Alliance
Ops	Operations
PIAB	Presse- und Informationsamt der Bundesregierung
RTTY	Radioteletype
SAM	Special Air Mission
SATCOM	Satellite communications
SHARES	Shared resources
SITOR-A	Simplex teleprinting over radio system, mode A
SITOR-B	Simplex teleprinting over radio system, mode B
Unid	Unidentified
USAF	U.S. Air Force
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USMC	U.S. Marine Corps
VIP	Very Important Person

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Time Universal)

500.0 VIM-Melbourne Radio, Australia, with CW marker at 0618. (Eddy Waters-Collinswood, Australia)

518.0 Gislovshammer Radio, Sweden, with SITOR-B NAVTEX at 0735. (Robin Hood-UK)

1641.0 GNI-Niton Radio, UK, with traffic list at 0738. (Hood-UK)

1775.9 Spanish voice followed by CW signal with lots of numbers and slash bars at 0359. Any ideas on this one? (Kevin Carey-NY) *Not a clue Kevin, thanks for checking in-Larry.*

2201.0 VIP-Perth Radio, Australia, with voice weather for western Australia at 1129. (Waters-Australia)

2244.0 I6DH-Possible Czech MOI station with 50 baud RTTY. Uses five callsigns each hour at 2245. (Ary Boender-Netherlands)

2357.5 OUA32-Danish Navy Stevns, Denmark, with CW X21C broadcast at 2209. (Boender-Netherlands)

2461.5 Irish Navy Dublin with routine SITOR-A messages at 2209. (Boender-Netherlands)

2622.0 Liberty Star working Cape Radio at 0916, moved to 5711. (Anonymous)

2953.0 ULX-Israeli Mossad number station heard weakly at 2304. (Takashi Yamaguchi-Nagasaki, Japan)

3068.0 Nightwatch working WAR 46 at 0506 and Absorbine at 0509 with signal checks on Zulu 100. However, Absorbine didn't check into the net until 0535. (Jeff Jones-CA)

3078.0 Andrews working Nightwatch 01 on F182 at 0245 for signal checks moved from 6730.0 and 8026.0 (Possibly related to the SAM 203 DV-2 mission to Haiti earlier today, also using 6730.0) (Jones-CA)

3116.0 Spar 67 working Andrews VIP for phone patch traffic at 0311. (Jones-CA)

3134.0 Nightwatch working WAR 46 on Zulu 110 at 0413. (Anonymous)

3143.0 Bombcrew working Nightwatch 01 on Zulu 115 at 0706. (Anonymous)

3150.0 PCD2-Israeli Mossad number station heard weakly at 2234. (Yamaguchi-Japan)

3270.0 KPA2-Israeli Mossad number station heard weakly at 2218, also noted on 4463/4780. (Yamaguchi-Japan)

3417.0 ART-Israeli Mossad number station heard weakly at 2234 and 0804. (Yamaguchi-Japan)

3821.0 Local ham operators trying to find Andrews AFB on the map after Andrews (female operator) walked on them bigtime with a series signal checks with SAM 300. Andrews did not acknowledge the hams' repeated attempts to break into the comms and the hams soon assumed that Andrews could not hear them. As soon as SAM 300 shutdown for the night Andrews came up on freq for a one-on-one with the hams, "This is a *published* USAF frequency." One of the hams replies, "Sooo!!, you could hear us all this time!...Andrews you are in the middle of the ham band" (etc., etc., etc...) Andrews scolds them once more and is gone. Loud and clear at 0523 (Jones-CA)

4165.0 CIO2-Israeli Mossad number station heard weakly at 0847. (Yamaguchi-Japan)

4213.0 VIP-Perth Radio, Australia, with SITOR-A messages to ships at 1120. (Waters-Australia)

4445.0 UW Log of the Month. Vint Hill working Ft. Stewart and Ft. Gillem in voice and CW. Heavy interference so station went to telephone. At 0400 found them on 4640. Sounded like a communications exercise with slow speed (12 wpm) CW and USB voice. I found the use of CW curious for these days. Assume Vint Hill is Vint Hill Communications and Electronic Support Group at Warrenton, VA. There is also an intelligence group located at Ft. Stewart, but I don't show anything similiar at Ft. Gillem. I have never seen Vint Hill logged on HF. (Gary Russell-Urbana, IL) *The only Vint Hill I see are 4-digit Spanish number stations. Great catch, Gary-Larry.*

4458.0 SAM 27000 working Andrews VIP for SAM 974's primary freq. 0020 (Jones-CA)

4463.0 KPA2-Israeli Mossad number station heard weakly at 2218, also noted on 2370/4780. (Yamaguchi-Japan)

4637.5 HL4891 working Rig 38 (Oil platform somewhere in the Gulf of Mexico) and other "rigs" at 0933 with status reports. (Jones-CA)

4665.0 VLB-Israeli Mossad number station heard weakly at 2126. (Yamaguchi-Japan)

4721.0 Andrews trying to raise SAM 27000 gets Foxtango player "PAPA." Andrews asks for ID and upon verifying PAPA's call, ignores his request for a signal check at 0830 (Jones-CA) SAM 27000 enroute home station from Elmendorf working Waldorf via Andrews about coming up on RF5 out of Wright Patterson. Previously on 4742.0 (as secondary) and 6993.0 at 0730 (Jones-CA)

4742.0 Air Force 2 (with DV-2 + 32) enroute SLVR, working Andrews VIP with phone patch traffic. Previously on 6993.0 at 0600 (Jones-CA)

5091.0 JSR-Israeli Mossad number station heard weakly at 2132. (Yamaguchi-Japan)

5435.0 ART2-Israeli Mossad number station heard weakly at 1032. (Yamaguchi-Japan)

5437.0 ART-Israeli Mossad number station heard weakly at 1434, 2103, and 2133. (Yamaguchi-Japan)

5211.0 KPC324-Virginia Task Force 2 checking into a FEMA NECN exercise at 1433. Station expressed an interest in joining the regular FEMA Tuesday net. WTDL-MARAD King's Point, NY, with a 1512 check-in. DLA293-DLA Alexandria, VA, at 1622. WNFT417-Bellcore Washington, D.C., at 1618. The NS/EP role of Bellcore and probably other industry stations has been transferred to a new organization at the end of December 1996. The new organization is the NTA (National Telecommunications Alliance). (Jack L. Metcalfe, KY)

5224.0 ANDVT comms noted here at 0855. (Jones-CA)

5236.0 WPEH728-AT&T Conyers, GA, as coordinating station for the SHARES 96-3 exercise. Voice check-ins included: Big Lake-USAF Reserves, San Antonio, TX at 1304; WNWK804-Cincinnati Bell, OH, at 1400, S4L-2nd US Army Atlanta, GA, at 1509; and KCJ20-FAA, Farmington, MN, at 1553. (Metcalfe, KY)

5266.0 USCG Group Woods Hole, MA, to 'A' unit then secure comms at 1915. (Roger Parmenter-Hyannis, MA)

5271.0 ANDVT comms noted here at 0440 (Jones-CA)

5340.0 Bravo-Whiskey frequently working Delta-Lima, Victor, etc., etc. Ocasionally BW passes net control to station Bravo-Bravo. Heard mentioned: "Expedite delouse" "Malibu" "Camelot" "Birds RTB" "Air Wing Red" Weak-readable with RTTY interference at 0210 (Jones-CA)

5479.0 Masterpiece working Big Tiger and Mystery Ship at 1134. (Boender-Netherlands)

5517.0 Tripoli Aeradio working Khartoum Aeradio at 2302. Seems that this new MWARA AFI-3 frequency replaces 5658 as most of the AFI-3 stations are now on this frequency with little traffic heard on 5658. (Russell-IL)

5598.0 New York Aeradio working Aeroflot 333, Delta 6300, KLM 158 at 2220. (Edward Schwartz-Chicago, IL)

5700.4 Magic Carpet Sierra at 0200 working/supporting data comms with A5C. Also heard in the net: Habitat, M8, E8M, and E8J at 0200 (Jones-CA)

5710.0 SAM 26000 (0 DV + 2) working Andrews VIP for data freq assignment: F-909 (7687.0) and for phone patch to SAM Command at 0428 (Jones-CA)

5718.8 Unid U.S Navy station with transmission that sounded like a weeping whale at 2144. (Boender-Netherlands)

5800.0 Doorknob working Suitable with secure voice check, "Negative at this time." 0722 (Jones-CA) Tigereye calling Nightwatch 01. No joy at 0312 (Jones-CA)

5820.0 YHF-Israeli Mossad number station heard weakly at 1404. (Yamaguchi-Japan)

6437.0 PCD2-Israeli Mossad number station heard weakly at 1304. (Yamaguchi-Japan)

6507.0 VIM-Melbourne Radio, Australia, giving weather info for the coast of South Australia at 1124. (Waters-Australia)

6604.0 New York Volmet with aviation weather at 0808. (Schwartz-IL)

6673.0 Gemini 172 with phone patch to Gemini Ops via Houston (Universal Radio LDOC). (Anonymous)

6730.0 SAM 203 (DV-2 + 2) enroute to Port-au-Prince, Haiti, working Andrews VIP for phone patch traffic. Gave "Port-au-Prince Air Ops" as DSN 200-290-3478 at 2323 (Jones-CA) Navy 50511 (DV-3 + 1) while still on the ground, came up on this freq at 0123 working Andrews VIP for signal checks. (Jones-CA)

6798.0 Acrobat working Punisher setting up loopback circuit on B2. ID'ed this one as A2. (Larry Van Horn-Brastown, NC)

6830.0 Andrews VIP checking SAM 26000 here for new primary, "867." 0533 (Jones-CA)

6840.0 EZI-Israeli Mossad number station heard weakly at 1232. (Yamaguchi-Japan)

6870.0 KDM49-FAA College Park, GA, and KEM80-FAA, Washington, D.C., with LSB signal checks at 1247. One of the operators was in a rooftop EOC watching the sun rise. (Metcalfe, KY)

6993.0 SAM 375 working Andrews VIP for phone patch to State Ops regarding message relay to party in Guatemala. 2228 (Jones-CA) Air Force 2 (SAM 974) DV-2 + 32, working Andrews VIP with phone patch traffic: CACTUS-3 ("Camp David Comm Center") 301-824-XXXX re: SATCOM problems and SAM Command at 0159 (Jones-CA)

7325.0 Andrews VIP checking SAM 26000 here on "268" re: data comms. 0536 (Jones-CA)

7690.0 Acrobat working Punisher setting up loopback circuit the day after the 6798 intercept. (Rick Baker-Austintown, OH) *Also noted here in Brasstown-Larry.*

7821.0 Analog "green" comms at 2308 (Jones-CA)

7873.0 Nightwatch working MacDill AFB at 0518. (Anonymous)

8007.5 C-E-B calling any station this net at 0616. (Anonymous)

8026.0 SAM 60203 working Andrews on F290 at 2129. (Anonymous) SAM 27000 working SAM 974 regarding GEP channel coordination out of Waldorf at 0030 (Jones-CA)

8039.5 P7X-U.S. military (?) with 5 letter groups in CW at 1648. Two high speed data signals between CW transmissions. (Metcalfe, KY)

8047.0 SAM 90300 working Andrews on F752 at 1636. (Anonymous)

8057.0 SAM 201 working Andrews for phone patch to SAM Command Post at 2323 (Jones-CA)

8080.0 7th Marines net control working KL43 data with 3rd Track. Also heard: 3rd TRACK-C.O.C., 3rd LAR, 3rd AMERICAN, and others, in a very active net. (Believe it or not, the 7th Marine op told others in the net that callsigns were NOT necessary!) at 0050 (Jones-CA)

8176.0 VID-Darwin Radio, Australia, calling all ships listening on 6206 at 1208. VIP-Perth Radio, Australia, with weather for western Australia at 1125. (Waters-Australia)

8417.0 ZLA-Global Radio Wellington, New Zealand, in SITOR-B at 0936. (Waters-Australia)

8419.0 VIP-Perth Radio, Australia, with CW channel marker at 1122. (Waters-Australia)

8445.0 XSX-Keelung Radio, Taiwan, with CQ CW marker at 1056. (Waters-Australia)

8446.0 A4M-Muscat Radio, Oman, with DE CW marker at 1359. (Waters-Australia)

8457.0 OFJ-Helsiniki Radio, Finland, with CW marker at 1332. (Waters-Australia)

8469.0 EQI-Abbas Radio, Iran, with CQ CW marker at 1334. (Waters-Australia)

8473.5 A7D-Doha Radio, Qatar, with DE CW marker at 1335. (Waters-Australia)

8502.0 XSG-Shanghai Radio, China, with CQ CW marker at 1018. (Waters-Australia)

8581.9 Ningbo Radio, China, with CQ CW marker at 0906. (Waters-Australia)

8843.0 N78RP working Honolulu Aeradic at 0052. (Gordon Levine-Anaheim, CA)

8855.0 Cayenne Aeradio working Springbok 266 at 2235. (Russell-IL)

8968.0 King 83 calling an unid station (later referred to as Alpha Bravo) with request for weather at 1858. (Steve Garrity-AZ)

8912.0 KDM80-FAA Hampton, GA, calling KDM49-Atlanta, GA at 1517. (Russell-IL)

9014.0 Gemini 91 working Raymond 07 with arrival message at 1420. (Russell-IL)

9016.0 Darkstar November with a phone patch via Hickam GHFS at 1841. (Anonymous)

9017.0 SAM 204 phone patch to DSN 582-4442 at 0013. (Jones-CA)

9018.0 Brill 11 working Brill 12 at 2032. (Anonymous)

9023.0 SAM 56974 working Andrews on F467 at 0238. (Anonymous)

9027.0 SAM 26000 working Andrews VIP for phone patches and periodic signal checks at 0453. (Jones-CA)

9042.7 5YE-Nairobi Meteo, Kenya, at 0420 with 100 baud RTTY traffic. (John Griffin-Hillsdale, NJ) *Welcome to the UW column, John. I hope to see you here often-Larry.*

9106.0 Bravo 050 and Foxtrot after several ALE bursts. Both returned to scan at 2138. (Metcalfe, KY)

9120.0 SPAR 19 working Andrews VIP at 2314 (Jones-CA)

9130.0 EZI-Israeli Mossad number station heard weakly at 1202. (Yamaguchi-Japan)

9152.4 D4B-Sal, Cape Verde Islands, with 50 baud RTTY traffic at 0454. (Griffin-IL)

9251.0 Lincolnshire Poacher numbers station at 1800. (Mr TV-UK)

9362.0 German government news service (PIAB) Bonn, Germany, with FEC-A news bulletins at 1545. (Hood-UK)

10493.0 W2B-U.S. Army Test & Evaluation Command-Aberdeen Proving Ground, MD, at 1815. WGY918-FEMA Lakewood, CO (location given on the air), at 1939. KCR873-USDA Boise, ID, at 2057. All heard during a FEMA NECN exercise. (Metcalfe, KY)

10583.0 SAM 375 working Andrews on F987. (Anonymous)

10780.0 Cape Radio working unid at 2135 (Jones-CA)

11039.0 DDH-Offenbach Meteo, Germany, with 50 baud RTTY weather at 1216. (Waters-Australia)

11061.7 MFA Jakarta, Indonesia, with SITOR-A messages in Indonesian at 0958. (Waters-Australia)

11153.5 SAM 204 working Andrews VIP for phone patches at 2135 (Jones-CA) Air Force 1 working Andrews VIP and SAM 050 with signal checks on new primary F-576. Previous primary was 8047.0 at 2220 (Jones-CA)

11175.0 MB500 working Bluestar-NAS Roosevelt Roads via DSN phone patch to 831-4344 at 1521. (Russell-IL) PADX (spelled out phonetically) working MacDill GHFS at 1711. (Levine-CA)

11181.0 96 with phone patch via Thule GHFS at 1815. (Anonymous)

11214.0 Chalice Bravo working many stations at 1900 and the next several hours including Deerhunter and Bigfoot. (Levine-CA)

11217.0 Shuck 96 returning from Saudi Arabia enroute Tinker AFB via "England and Goosebay" working Macdill on this "discrete" for phone patches into Tinker AFB at 2111 (Jones-CA)

11220.0 PACAF 01 working Andrews VIP for phone patch traffic to SPAR Operations at 2315 (Jones-CA) SAM 60204 with phone patch via Andrews on F311 at 1811. (Anonymous)

11244.0 Ornament calling Thule GHFS with phone patch to Nightwatch 01. Moved to 13200 at 1517. (Mr TV-UK) Unid station sending EAM at 2156. (Mike Layden-PA)

11390.0 Aeroflot LDOC Moscow working unid aircraft in Russian at 1445. (Russell-IL)

11413.0 Air Force Two working Andrews AFB on F574 at 2330. (Anonymous) SAM 375 (USAF C-20H) at 2020 working Andrews VIP on freq. 574 regarding SATCOM coordination. (Jones-CA)

11460.0 PACAF 01 working Andrews VIP for a brief signal check at 0120 (Jones-CA)

11494.0 Nightwatch 01, as net control working Fivespot and Abruption. Also mentioned using Zulu 211 (12070.0) at 2241 (Jones-CA)

11565.0 EZI-Israeli Mossad number station heard weakly at 1003, also noted on 13533.0. (Yamaguchi-Japan)

13951.0 Unid station with 5 letter groups in SITOR-A at 1650. Possible diplo. (Metcalfe, KY)

14871.0 English female 5-digit Linconshire Poacher number station at 1015, very strong here, also noted on 15682.0 (Yamaguchi-Japan)

15043.0 Nlightwatch 01 attempting to work Macdill. Then in the blind, referred Macdill to DSN 939-1852 at 2030. Shuck 96 trying to raise McClellan AFB with no joy at 2106 (Jones-CA)

15048.0 Navy 49676 working Andrews on F662 at 2028. (Anonymous)

15770.0 Deutsche Welle relay Trincomalee, with RYs and ID test using 100 baud RTTY at 0825. (Hood-UK)

18308.0 Delta 3 Delta working Wild Eagle 41 at 0903 (USMC?). (Anonymous) *The only thing I show for this frequency is that it is an Inter-American Air Force Academy training support frequency-Larry.*

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Why Not Shortwave Television?

WWCR hopes to pioneer shortwave TV—or should we call it video? The technology used for telephone video and Internet video can be adapted for digital shortwave transmission. The computer program (and updates as needed) would be provided by WWCR on Internet. Certain shows on WWCR would be able to provide shots of the speaker, refer to graphic stills, or be accompained by other video carried on a second out-of-band transmitter. As an international medium, SW video might be objectionable to some countries which do not welcome foreign images crossing their borders. WWCR is looking for technical advice on how to make this happen, and of course awaits FCC approval for experimentation, according to George McClintock of WWCR.

"Temporary solutions are not enough!" says the Coalition to Restore Full RCI Funding. Radio Canada International has been saved for now, but government members continue to speak ambiguously about the future. Now is the time to assure that this yearly confusion stops, they say. The Coalition asks listeners to please make it impossible for the politicians in Ottawa to ignore the message that RCI needs long-term, secure, separate, and sufficient funding. Please fax or e-mail Prime Minister Jean Chretien, 613-941-6900, pm@pm.gc.ca; Minister of Canadian Heritage Sheila Copps, 613-992-2727, min_copps@pch.gc.ca; and Minister of Foreign Affairs Lloyd Axworthy, 613-996-3443, axworl@parl.gc.ca. Mail to all at House of Commons, Ottawa K1A 0A6.

This month we have news of new broadcasts from Denmark, Malta; new programs from Australia, Bangladesh, Ethiopia, Germany; HCJB's fuzzy plans for a relay in Australia. France and India board the Internet, perhaps at the expense of shortwave. And Radio Free Asia struggles to keep transmitter sites, losing some, adding some.

ANGUILLA Caribbean Beacon local ID never heard, but Dr. Gene Scott finally activated SW there in late Dec on 11775 before 2200, then 6090, same frequencies tested last summer; duplicates programming on WWCR, KAIJ, But Anguilla frequencies would be off for days or a week at a time without explanation. We hear that power grid on Anguilla is very unreliable and may damage unprotected transmitter. Scott also has commitment to keep existing WWCR, KAIJ transmissions.

ANTARCTICA LRA36, 15476, is expected to resume broadcasting in March (Gabriel Iván Barrera, Argentina, *BC-DX*) Each year there is a completely new staff with little else to do during the winter, so programming may be quite different. (Harald Kuhl, DSWCI *DX Window*)

ARMENIA R. Free Asia suffered another blow Jan. 1 when Armenia canceled its contract for Chinese broadcasts under pressure from Beijing, as Kazakhstan had done earlier. But both have agreed to carry broadcasts to other parts of Asia (Rone Tempest, Los Angeles *Times* via Mike Cooper)

AUSTRALIA RA's revamped programming includes: standard 10 mins of news on the hour, but within that, 5-minute rotating segments of Asian, world, Pacific news. Current affairs program cut back to one hour, no repeats, recycled every three hours. Rebroadcasters can pick modules they want. Ten percent budget cut may lead to closure of some languages (Terry Brown, RA Asst. GM, VOA *Communications World*) ABC seems about to give up on RA. Staff already reduced from 220 in 1990 to about 150, and services' broadcast hours cut (RodneyTiffen, *The Australian* via *EDXP*) ABC's problem is too many managers and a hidden bureaucracy (Anne Davies, *National World* via Mike Cooper)

A WIA ham broadcast said HCJB has purchased property in Australia to erect a SW sender for Asia. Location unclear, but previously talked about northwestern WA in the Kimberly (Robin L. Harwood, Tasmania, *rec.radio.shortwave*) Ron Cline, WRMF president says it's a 500 ha site in WA, but it's up to the Oz govt to decide whether they are willing to take the heat for allowing Christian broadcasts to Moslem, Hindu countries (RN*MM*) No firm plans in place, and no negotiations yet with Oz federal govt for permission to build or operate in WA (WRMF Oz office via HCJB *DX Partyline*)

BRAZIL Decree 2108 sets out regulations for new radio and TV licenses. From now on, all will be issued through public bids in compliance with Law 8666. Only radio services for exclusively cultural purposes will be exempt. This includes SW and tropical band. The same company is eligible to be awarded no more than one radio broadcasting license in the same locality (Agencia Estado news agency via BBCM)

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; Z-96 = Summer season; W-96 = Winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there.

BURKINA FASO R. Burkina announced that its daytime frequency at 0800 would be 7230 intead of 9515 for better reception; still on 4815 evenings and early mornings (BBCM)

CANADA *Madly Off in All Directions* comedy show has replaced *Royal Canadian Air Farce* until April, as RCAF produces TV version; via RCI Sat 2204 on 9805 and others, Sun 0332 on 6155, 9755 (gh) Comedy shows replaced by *Global Village* Mon 1307-1400 on 9640, 11855 (Chet Copeland, DC)

CFRX, 6070 has jacked up its audio power; barely audible in the past, now sounds like 250 kW near the Ontario-Manitoba border, often stronger than RCI (Ernie Behr, Kenora, *Continent of Media*)

CHILE R. Triunfal Evangélica, 5824.8 broadcasts *2100-2400* except Thu, Sun, says owner Fernando González Segura; typical gospel programming (Gabriel Iván Barrera, Argentina, *Radio Nuevo Mundo*)

COLOMBIA La Voz de la Provincia, Guaranda, Sucre, an unlisted "community broadcaster" harmonic varies 2868 to 2915, nom. 1450, drifting downward evening, s/off 2300* and upward in morning. RCN Caquetá, Florencia at 2242 on 2880.1; Ecos de Pueblo Rico, Risaralda, harmonic on 2968.8v at 2300 (Henrik Klemetz, *Dateline Bogotá* via DSWCI *DX Window*)

COSTA RICA 88 Estéreo, Pérez Zeledón, were ready to go on SW 6075 from Jan 5 with a sesquikW at 1100-0500; Apartado 827-8000; fax +506-771-5539. says Juan Vega, Director in a phone interview (Tetsuya Hirahara, CR, *NU* via *BC-DX*)

RFPI would like to install curtain antenna array, tho space at the University is limited; board was to consider this in Jan (RFPI *Global Community Forum*)

R. Universidad, 6105, 0535-0603 with film and classical music, 0600 ID, religious message (Don Moore, IA, *DXing with Cumbre*)

CUBA RHC English heard on 5025 one night at 0500-0515+ //9830, 9820, next day back to normal R. Rebelde in Spanish (Brian Alexander, PA) Compare RHC signals at 0500-0700 in English: 9820 is 100 kW toward WNAm, 2x4 curtain with 15 dB gain; 9830-usb is toward Europe with 12 dB rhombic. Tinored server is sometimes down preventing E-mail to RHC, and cannot handle long or audio files yet (RHC *DXers Unlimited*)

DENMARK [non] World Music Radio plans to launch on Easter Sunday, Mar 30, at least four hours every Sunday, to be listener-financed by middle-aged European SWLs now in a position to do so (Stig Hartvig Nielsen, Denmark, *DX Window*) *Previously did R. ABC/Denmark via Kaliningrad 7570-gh*

ECUADOR There are plans for launching a project called R. Amazónica para la Paz, along the disputed border with Perú, two stations, one on each side, with participation of two Ecuadorian and two Peruvian tribes, per a report in *El Universo*, Guayaquil (Harald Kuhl, Germany, DSWCI *DX Window*) January drought in Ecuador was expected to cause rotating blackouts affecting all but the largest radio stations having their own generators; even non-drought areas in

jungle affected, since they depend on power from elsewhere (HCJB *DXPL*)

HCJB: see AUSTRALIA

ETHIOPIA R. Ethiopia undated printed sked shows English on the National Service 1030-1100 on 5990, 7110, 9705; and on External Service 1600-1700 on 11800, 9560, 7165, with news at 1630 amid these topical programs: Mon, *Kaleidoscope, Women's Forum.* Tue, *Press Review, Africa in Focus.* Wed, *Guest of the Week, Ethiopia Today.* Thu, *Ethiopian Music, Spotlight.* Fri, *Press Review, Introducing Ethiopia.* Sat, *Contact, Ethiopia This Week.* Sun, *Listener's Choice, Commentary* (via RCI, Bill Westenhaver)

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Cable: Ethiocast. Addis Ababa

V. of the Tigray Revolution, P.O. Box 450, Mekele, 10 kW in Tigrigna: 0330-0500 (Sat/Sun 0400-0800), 1500-1600 daily on 7515, 5500 (BBCM)

R. Fana (Torch), private station in Addis Ababa, heard on new 6940 //6210, 1625-1729*, ex-9335. The 6940 channel has been used by EPRDF radios in the past (BBCM) 6940 //6210 at *0327-0350+, exotic vocals (Brian Alexander, PA)

FRANCE Heard on *club des auditeurs* that RFI plans to stop SW to Europe, NAm. Apparently they believe that everybody has a satellite dish or Internet connection for continuous listening, but invites letters from listeners (Eric Dujardin, *rec.radio.shortwave*) RFI programs from the past 24 hours in French, and some English and Spanish are available at **www.rfi.fr**(Canal+ via BBCM) RFI 1 Monde, the main external service in French, now "all news" does have a bit of music on the schedule, such as Sat & Sun 2210-2230 *Musiques du Monde* on 5920, 5945, 9715, 9800, 13640 (via Bill Westenhaver) see also RUSSIA

GEORGIA Georgian Radio's new sked following transmitter upgrading includes English half-hours: 0800 CEu 11910, 0930 ME 11910, 1630 ME 6230, 1800 CEu 6080; also has German, Russian and Georgian. R. Abkhazia from Tbilisi in Russian 0430-0500 on 5040 Wed & Fri, Georgian Mon & Thu. R. of the Republic of Abkahzia, Sukhumi in Abkhazian and Russian at 0430-0530, 1500-1600 on 9495--really 9494.75; Wed and Fri in Georgian, timings fluid (VOR DX Klub via BBCM) Really 0430-0500, Wed & Sat 0530-0615, Tue & Sat 1130-1500, daily 1530-1800, Tue & Sat -1830 (BBCM)

Georgian Radio, Pgm I, 0100-0700 5040, 0700-1100 5040, 4875, 1100-2130 5040. Pgm II, 0200-1830 4875 (BBCM)

GERMANY DW has an overall 10 megamark budget cut this year, but the program budget in particular is being raised by 3 megamarks. Over the past two years, DW has cut more than 300 jobs by early retirement to 1800 positions, a 15 percent reduction and net savings of 10 megamarks. One fifth of the DW budget, or about 120 megamarks, goes into dissemination via shortwave and other media (Dieter Weirich, DW via BBCM) DW claims 30-40 megalisteners daily (HCJB *DXPL*)

DW made several program changes in English to NAm: *Mailbag* now UT Sun 0135, 0535, one day earlier [and presumably DX program last week of month also moved here]; *Arts on the Air* Mon 0108, 0308, 0508 complete, replacing edited version Fri 0132, 0532. *Living in Germany* now Tue 0132, 0532, instead of all three Mon broadcasts. *German Tribune* now Thu ex Tue at 0132, 0532. *What's New*, the new science program, Fri 0132, 0532. *Religion and Society* Sun 0335, not at 0135, 0535. Times may vary 3 minutes either way (Jim Moats, *World of Radio*)

GUINEA RTG Conakry, 7125.63v at 0635-0645+, voice modulation low,irregular (Brian Clark, NZ, DSWCI *DX Window*) Often mars Voice of Russia 7125.0 around 2300 (gh, OK)

HONDURAS R. Galaxia, Santa Bárbara, 6075, very weak but clear at 1505-1530+, probably old La Voz del Junco transmitter (David Crawford, FL, *BC-DX*) What I am hearing on 6075 is La Voz del Junco, at 1240 (Henrik Klemetz, Colombia) *Galaxia may be their FM relayed-gh*

HRMI, La Voz de Misiones Internacionales, may have raised power as expected, became regular on 5890-usb but no BFO needed from *1200v; first hour is live preacher, sometimes reading reception reports in Spanish from Americans around 1245 such as Ed Rausch, Christopher Lobdell; time checks run about 5 mins fast. Says station is part of a worldwide network (gh, OK)

HUNGARY R. Budapest's *DX Show* celebrates its 40th anniversary this year on Oct 4. In March would like to establish register of longstanding listeners; send copies of of old QSLs or verification letters, and indicate receiver then used. In May and June, quiz programs open to all listeners. In Sept and Oct, a DX contest (*BC-DX*)

INDIA AIR now available on Internet with RealAudio, news updates in Hindi, English, also features: **http://air.kode.net**—but poor audio, perhaps due to narrow pipeline from Delhi to Europe (RN*MN*) News audio is rugged, music better! Also with Hindi drama (VOA *CW*)

IRAN [non] V. of Southern Azerbaijan, in Azeri, 0615-0715 on 11935, 1630-1730 on 6055. Supports National and Independent Front of Southern Azerbaijan, hostile to Iranian government (BBCM)

V. of the Worker (*Seda-ye Kargar*), 1730-1815, repeated next day1530-1615 on 4200v, 3930v in Persian. Previously had a frequency 3885-4215v (BBCM)

IRAQ R. Iraq, 11889.95, English at 2337-2400*, very poor (Don Phillips, UK, DSWCI *DX Window*) [non] Observations of opposition radios the last week of 1996: V. of the Iraqi People, V. of Democracy and Progress, the Communist Party station, 1730-1830 on 3910, announcing also at 0400, and also on 49mb, but not found tho previously on 5825. 7045. V. of the Iraqi Communist Workers' Party not heard since early Sept.—experience has shown only one of these two is audible at one time; was on 4000. V. of the Islamic Movement in Iraqi Kurdistan, 1700-1800 in Arabic on 4136, 4400, 6305. V. of the People of Kurdistan, in Arabic and Kurdish around 4100, not traced on 49mb as announced. V. of Iraqi Kurdistan, Kurdish and Arabic 1650-1930 on 4070. V. of Rebellious Iraq, 1300-1530 on 6080. V. of Iraqi Islamic Revolution continues to be untraced. V of the People of Kurdistan, of the Jalal Talabani-led PUK, announced in Arabic that from Jan it would be on 6020 instead of 4080 daily at 1000. V. of Iraqi Kurdistan reported that R. of Kurdistan Region, mouthpiece of the govt of Iraqi Kurdistan would soon be inaugurated, one hour daily on 75m (BBCM)

JORDAN R. Jordan expanded English to Europe/NAm another hour, opening at 1100 until 1730 on 11690 (Edwin Southwell, England, *World of Radio*) Puts to shame Israel's short and always endangered English segments. Noticed a mailbag show called *SINPO-CON* on a Sat from 1640 tune-in until 1650 (gh) News on the hour, but major newscast at 1700 (Eugene Gebreurs, RVI *Radio World*)

KURDISTAN [see IRAQ]

LAOS LNR QSLing for first time since 1978; must be cleaning out files with full-data card for 1995 report, along with used Lao stamps, sked, also received by other Japanese listeners (Nobuaki Takahashi, R. Japan *Media Roundup*)

LITHUANIA R. Vilnius can be heard direct on 9710 from *0900 in Lith, 0930 English; drifts downward so by 0915 on 9709.9 hetting Australia (Tony Jones, Paraguay, *DXing with Cumbre*) [non] R. Vilnius English to NAm at 0030-0100 added 5890 due to Albanian interference on 6120 (Roger Tidy, England, *W.O.R.*) via Deutsche Telekom, Jülich, Germany, and later dropped 6120 (*BC-DX*)

MALTA [non] VOM planned new tests to NAm as R. Melita from first Sunday in Feb, to the east on 7400 and the west on 13600 at "11 am to 2 pm local time" starting with an hour in English; also new broadcasts to Japan, Europe (Bob Padula, *EDXP*) *Presumably starting at 1600 and 1900 respectively, more Russian sites?-gh*

MÉXICO XERMX is still working on putting a never-used 100 kW transmitter into service, with a TCI log periodic antenna. Also being analyzed is the possibility of moving the transmitter site to a new location in the interior of the country (R. México Internacional via Shoji Yamada, *Radio Nuevo Mundo*) In 1996 got a thousand letters from 32 countries (XERMX *Radio Correo del Aire*)

XEXX, Super Dos Equis, nominal 1420, Tijuana, has been heard on 1680 by Paul Ormandy in New Zealand. This could explain it: a mixing product with another Tijuana station on 1550, especially if they share a tower (Andy Gardner, NZ, *rec.radio.shortwave*)

MONGOLIA Mr. Batbayar Demchig of the English section at R. Ulaanbaatar took part in a Saar DX meeting in November. Foreign service is using a site at Khonkhor, 25 km E of Ulaanbaatar with two SW transmitters: a 250 kW unit can be fed into three curtain antennas aimed 126° to EAs/Pac, 178° to Au/NZ, 220° to SAs; and a 50 kW for a separate antenna to Eu at 279°. In 1994 all reflectors on the Au beam were removed, so the antenna pattern is broader towards N Siberia and Australia. Now considering removing reflectors from 126° antenna, resulting in better Eu coverage. SAs antenna also gives solid signals in to E&SAf. The 126° is also heard in Argentina and Brazil (Volker Willschrey, *Weltweit-Hören* via *BC-DX* via George Thurman)

NETHERLANDS RN's documentary Wed Mar 12 on primary hour, Fri Mar 14 on secondary is "Andorra: The Mini State" (*On Target* via Diane Mauer, Steven Cline, Jim Moats, Bob Thomas) *Radio Enlace* will have monthly reports this year from Carlos Zípfel Valencia about Guatemalan radio, Fridays on the primary hour, Sundays secondary (gh)

NEW ZEALAND *Kiwi DX* is new monthly DX program on Print Disabled Radio, third Tuesday at 0730 on 3935 and 5960 or 7290, repeated Sunday 0330, primarily of interest to NZ listeners (Paul Ormandy, *Kiwi DX* via *DXW*)

NICARAGUA R. Miskut, 5770-usb, did not stay on late for Xmas or New Year's Eve this year (Brian Alexander, PA) Sometimes audible before and after 1200, much weaker than HRMI (gh, OK)

NORWAY RNI decided to keep old Fredrikstad transmitter in use twice a day, even though new 500 kW Sveio is in regular use, says Olav Mo Grimdalen (Joe Hanlon, PA) *Monthly schedule revisions do not specify sites, but presumably Fred. is one of the frequencies when four are in use, at 0600, 1200, 1300, 1700, 1900 (gh)*

PAKISTAN R. Pakistan, based on monitoring in Dec, is entirely in English to Eu at 0800-1120 on 17900v, 15470; no English at 1700-1800 anymore, and the 1600-1630 only on 15555, 11570, 9515 (BBCM)

PALAU V. of Hope began transmitting R. Free Asia in early January, over the objections of Moses Sun, director of Mandarin broadcasts at the station. George Otis, head of High Adventure Ministries, says it's a separate 100 kW transmitter for RFA only, and will cut off RFA if they propagandize against the Chinese government (Rone Tempest, Los Angeles *Times* via Mike Cooper) *Did this long article ever get around to mentioning times or frequencies? Of course not! When it comes to stories about radio, mainstream writers must have flunked Journalism 101-gh.* RFA via KHBN on 9910 at 1500-1600, 2300-2400 (Robert J. German, George Jacobs & Associates via *Electronic DX Press*) Sometimes audible here at 1500, no KHBN ID heard (gh, OK)

PAPUA NEW GUINEA NBC Port Moresby running all night on 4890, peaking here around 1600 (Mike Barraclough, England, World DX Club *Contact*) Trevor Watson on R. Australia reported from Port Moresby that the NBC has had the same broadcast budget for 19 years, 7.5 megadollars, and that only 9 of the 19 transmitters were working either due to lack of maintenance—he called them in an appalling state of repair—or no money for electricity. Main studios had no air conditioning and were generally run down (David Norrie, South Africa, DSWCI *DX Window*)

PARAGUAY R. Encarnación, 11939.25 at 1700 full ID claiming to broadcast on 11990, not 11940 (Gabriel Iván Barrera, Argentina, *Cumbre DX*)

PERÚ R. El Sol, Pucará, northeast region of Marañón, new station on 5560.7, 1130-1200+ with wakeup show, second SW station in this town after R. Estación Uno, still alive and kicking on 5955 (Henrik Klemetz, Colombia, *World of Radio*) R. San Miguel de El Faique, 6895.3, announcing El Faique distrito, Huancabamba provincia, Piura departamento, Grau región, gives sked as M-F 1100-2300,nothing heard about weekends (Klemetz, *Dateline Bogotá* via *Cumbre DX*) R. La Voz, Andahuaylas, 6249.8, 0032-0100* and at 1058-1152 *Amanecer Andino* partly in Quechua. R. Laja, Chota, 5498.5 at 2132-2209 giving frequency as 5498 (Pedro F. Arrunátegui, Lima)

Heard during my Jan stay in Perú: Radiomar FM via R. Apurímac, Abancay on 5236.43 at 2320-2340, salsa. R. Universal, Moyobamba, 5767.12 at sign-on 1003 gave sked as 1000-0100 daily, but frequency wrong as "6766, 49 metros" (Takayuki Inoue N., *Relámpago DX*)

ROMANIA RRI keeps announcing 5995 for Eu at 1900, 2100, but they have really been on 5955 for decades! (Wolfgang Büschel, *BC-DX*) 1300 in English unstable on 9683.45 not 9690 (Jay Novello, NC)

RUSSIA V. of Russia is running a quiz for the upcoming 850th anniversary of the city of Moscow, "An Ancient City of Peace and Friendship." Ten questions must be answered correctly; listen to Sunday and Monday broadcasts twice a month for help. Deadline for mailing May 20. Top ten winners get an expenses-paid trip to Moscow (via Giovanni Serra)

North European Radio Relay Service—NERRS in Saint Petersburg, has obtained a license to broadcast on SW. Well known DXer Mikhail Timofeyev is involved; tests were to start in Jan (Nikolay Pashkevich, Russia)

R. France Int'l sneaked in new relay site, Ussuriysk, near Vladivostok: 2200-2300 Mandarin on 7315, 2300-2400 French to SEAs on 9830 (Bob Padula, *Electronic DX Press*) 7135 [not 7315] (BBCM)

SÃO TOMÉ VOA morning frequency 4960 ex-4750, including English 0300-0330, other languages 0500-0530(M-F -0600) (VOA *CW*)

SA'UDI ARABIA BSKSA has big transmitter problems: 0300 on 9553.6, 9619.5, 9718.3; 1200 on 15277.8, 1800-2000 on 12038.5 (*Panlview*)

SEYCHELLES FEBA Radio has new service to India at 0800-0900 Thu-Sun only on 15540 in several languages, including Fri entirely in English (Alok Das Gupta, India, *BC-DX*) English at 1500-1545v now on 11600 ex-11670, 11870 (Alok Das Gupta, *EDXP* via *The Four Winds*)

SIKKIM AIR on 3390 now mornings and evenings, heard *0100 and +1230-1600 (Sarath Weerakoon, Sri Lanka, UADX via *BC-DX*)

SLOVAKIA AWR dropped 2130 English on 6055 due to skipping over Britain, and co-channel from Russia; for *Wavescan*, KSDA Guam provides very good reception Sun 1030 on 9530 (Peter Lee, AWR, *World of Radio*)

SOMALIA R. Mogadishu, V. of the Masses of the Somali Republic, pro-Aydid, has external service: English 1300-1315, 2000-2015; Arabic 1315-1330, 2015-2030; Amharic 1330-1345, 2030-2045; Swahili 1345-1400, 2045-2100; other times in Somali such as 1700-2000, on 6870 or 6890 (BBCM)

SOUTH AFRICA R. Free Asia Meyerton relay ID, news in Chinese from 2254 on 7190 (Zdenek Elias, Czech Republic, WDXC *Contact*) *Site confirmed? No other reports they were using this-gh*

SUDAN [non] V. of Sudan from 0419 tribal music to 0502 ID in Arabic on 12008.02, 8000.10 and 9025.30 (Gabriel Iván Barrera, Argentina, *Cumbre DX*)

TAHITI RFO Tahiti presumed, no definite ID, but talked about Tahiti on their reported frequency, 15167.4v, at 0832 past 0900 (Pete Costello, NJ) *May be irregular, on last legs -gh.* No trace of 15167v heard in Nov, early Dec (Ernie Behr, Ont.)

THAILAND BBC relay started full operation Jan 1 to S Asia, including English 0800-1400 on 11750 (Alok das Gupta, *EDXP*)

TIBET [non] R. Free Asia, Tibetan at 1300-1400 on new 7355, maybe via KNLS? (Dave Valko, PA, *Cumbre DX*) Probably via Tajikistan (Wolfgang Büschel, Germany, *BC-DX*) KNLS still English at 1300 on 7365, vs. late-running Cuban jamming against Martí (gh)

TURKEY TRT Ankara in English at 1930-2030 to Eu, NAm kept moving from 5965 to 5970 to 6035 on LSB, also on AM 6000; 2300-2400 6135 supposed to be USB but heard on LSB (Wolfgang Büschel, *BC-DX*) The 0400 broadcast moved to 7100 ex-7300 ex-7340 (Gigi Lytle, TX, *World of Radio*) Runs until 0800; German hams are filing protests (*BC-DX*)

UNITED ARAB EMIRATES Dubai English at 0330-0400 on 13665, also announcing 11945, 15400, 21485 (Arthur Cushen, HCJB *DXPL*) Once in the morning I heard Arabic back on 13675 (gh, OK)

USA VOA, Delano, verified direct for report on *Communications World* test on 9455 at 0030—very nice photo card, aerial view of the Jack R. Poppele Transmitting Station, full data for taped report, from Perry G. Pitts, Station Manager, VOA, 11015 Melcher Rd., Delano, CA 93215 (Jerry Berg, MA, DSWCI *DX Window*)

VOA-Europe became VOA-Express Jan 1 after a special farewell SSB/SW broadcast New Year's Eve, but continuation depended on clinching a deal with a private partner (VOA *CW*)

Since 1994, USIA's broadcasting budget has been cut from $487 million to $350 million, resulting in more than 1500 lost jobs. Broadcasting hours have shrunk by about 30 percent. Republicans in Congress plan to cut further, calling for a complete end of federal financing for RFE and RL after 1999 (Jonathan S. Landay, *Christian Science Monitor* via Jim Moats)

R. Free Asia: see ARMENIA, PALAU, TIBET

World Of Radio on WWCR projected for March: Thu 2130 15685, Sat 1230 7435, 1400 15685, Sun 0400 3215, 1000 3210, Mon 0030 5070, Tue 1330 15685, Wed 1230 15685. See our website for latest update. This and all otherWWCR programs move one UT hour later for DST from April 6, and frequency spans may also change seasonally.

WWCR: *Net Connection* rescheduled to UT Mon 0100-0130 on 3215 (Adam Lock, WWCR) Chuck Harder returned to SW in January, via WWCR: M-F 2100-2200 on 12160 his third hour live, and Tu-F 0600-0700 on 3210, 2nd hour delayed (Adam Lock, WWCR) Also on WHRI at 2100 on 9495, but not //WWCR (*Domestic SW Report*) Harder WHRI sked is M-F 2100-2200 live on 9495, repeated M-F 0600-0700 on 5760, Sat 1300-1400 on 6040 (*DXing with Cumbre*)

William Cooper's *The Hour of the Time* is back on SW, via WRMI 9955, M-F 2200-2400; WRMI also added several more new far-right daytime talkshows weekdays, and weekly *Voice of Reform*, from Florida chapter of Ross Perot's party, UT Wed 0200 and 1400 (*W.O.R.*) Awaiting permission from FCC, WRMI's second antenna will be a yagi/log rotatable between north toward Toronto, west toward northern Mexico; will split time on present transmitter, later add a second (Jeff White, WRMI on HCJB *DXPL*)

Prophecy Countdown got another extension to end of January in paying off loan to purchase WVHA; claims it has a big audience in Nigeria, Kenya, and was managing to raise enough to pay-as-you-go week by week (*World of Radio*)

UZBEKISTAN The station broadcasting towards Muslims in India and Bangladesh with the program *Mukto Probaho* is R. Jebon Torango; replied with non-detailed letter in 5 months from P.O. Box 9406, Calcutta 700016, India, tho report was sent to their address in Bangkok; summer frequency was 15470 (Harald Kuhl, Germany, *DXW*)

VANUATU R. Vanuatu excellent one night, missing the next, on 4960 at 0800-0830+ including *Pacific News* in English, choral music (Steve Martin, CA, *Cumbre DX*)

VATICAN Xmas card from VR gives new E-mail address: <mc6778@mclink.it> and says will now issue only two program guides per year in April, November (Joe Hanlon, PA)

ZAIRE R. Candip, Bunia, heard at 1100 Dec 26 on 5066 with announcement in several languages; appeared to be under control of the rebel movement, Alliance of Democratic Forces for the Liberation of Congo-Zaire, led by Laurent Kabila (BBCM)

Until the Next, Best of DX and 73 de Glenn!

http://hudson.idt.net/~khecht19/radio/shortwave/ghauser

Broadcast Loggings

GLOBAL FORUM

Gayle Van Horn

0023 UTC on 6055
SPAIN: Radio Exterior Espana. Report on *Gypsy Week* and their relations with the Spaniards. (Bob Fraser, Cohasset, MA; Sue Wilden, Columbus, IN)

0026 UTC on 4500
CHINA: Xinjiang PBS-Urumqi. Chinese. Lady announcer to featured music. Station ID at 0030 into program segment. (Giovanni Serra, Rome, Italy/*The Four Winds* via email).

0030 UTC on 9650
URUGUAY: Emisora Ciudad de Montevideo. Two male announcers in Spanish with rapid sports commentary. QRM from Iran's **VOIRI** present, making for very poor signal reception. (Liangas, Greece, *TFW*)

0045 UTC on 7235
AUSTRIA: Radio Austria Int'l. Report on new history of Austria which covers the Nazi era. (Bob Fraser, Cohasset, MA)

0051 UTC on 4770
ECUADOR: Radio Centinela del Sur. Spanish talk to tentative ID format. Commercial and mentions of Ecuador. SINPO=24333. Ecuador's **Radio Quito** noted on 4918.9, 0726-0733 with romantic music, taped ID/kHz quote. Time check/ID slogan repeat, still audible at 0845. (Mark Veldhuis, Borne, the Netherlands via email)

0055 UTC on 11750
INDONESIA: (Java) RRI-Jakarta. Indonesian. Local pops to "warta Berita Ibukota." ID at 0110 by lady, "Radio Republic Indonesia Jakarta programa Nasional Dua," then local pops. Fair signal. (Yamada, Japan/*TFW*).

0105 UTC on 4875.01
BRAZIL: Radio Difusora Roraima. Portuguese. Canned announcement to live soccer commentary (go-o-o-o-al). Sound effects to commercial breaks, time check and station ID. (Serra, Italy, *TFW*)

0433 UTC on 6000
CUBA: Radio Havana. Report on how Cuba deals with hurricanes. (Wilden,IN)

0443 UTC on 4845.02
BOLIVIA: Radio Fides. Spanish. More romantic ballads with announcer talk overs. Low modulation for ID as, "Republica de Bolivia en las siguiente frecuencies: 9 ...kilociclos...6...4845 kilociclos, banda de sesenta metros..Radio Fides, la...de Bolivia." Brief Spanish song to 0503*. (Serra, Italy/*TFW*).

1048 UTC on 4780
GUATEMALA: Radio Coatan (Tent). Spanish music heard to 1120+. Additional Guatemalan's in Spanish, monitored as; **Radio Cultural** 3300 1100-1105; **Radio Maya de Barillas** 3324 1105-1110; **Radio Tezulutlan** 3370 1110-1115. (Lee Silvi, Mentor, OH via email)

1100 UTC on 4760
MYANMAR: Radio Myanmar. Audio carrier with bits of weak audio, including Asian music, audible on several mornings. (James De Young, VA/via email) **Voice of Myanmar** heard on 4725 at 1350-1543 in presumed Burmese. Talk and mentions of Yangon. (Veldhuis, Netherlands)

1108 UTC on 4939
CHINA: Voice of the Strait. Female announcer in rapid Chinese. Slight interference from Venezuela's **Radio Amazonas** on 4939.47. VO Strait also heard on 5049.98 with very weak signal. (DeYoung, VA)

1121 UTC on 4890
PAPUA NEW GUINEA: NBC. Speech excerpts from National Parliament, followed by Q & A session. (Silvi, OH)

1156 UTC on 4034.99
TIBET: Xinjiang PBS, Lhasa, China PR. Weak local music to Chinese text. Utility and local storm interferences noted. (De Young, VA)

1200 UTC on 5060
UZBEKISTAN: Radio Tashkent. Heard on //7285 in English to Southeast Asia. Unknown language at 1232, noting heterodyne from jammer on 5060. Interferences noted from amateur radio on 7285. (Silvi, OH)

1245 UTC on 15244.5
ZAIRE: Voix du Zaire. French. Heard almost daily up to 1542! French programming with talk and African pops, mentions of Zaire. (Veldhuis, Netherlands)

1250 UTC on 4775
INDIA: All India Radio-Imphal. Vernacular dialect to regional Indian music. Station ID at 1315. Best in USB, SINPO=23433. (Veldhuis, Netherlands) This site noted at 1605-1705* in Hindu. SIO=343. (Pavanello & Bernardini, Italy, TFW)

1410 UTC on 5039.2
PERU: Radio Libertad. Spanish. Music to "un saludos para todas las chicas que estan en sintonia de radio Libertad."(Arrunategui, Peru/TFW)

1422 UTC on 9535
JAPAN: Radio Japan. News show with talk of Japanese consumption tax, // 11705 much weaker. (Brian Boulden, Fairfield, CA)

1456 UTC on 4800
CHINA: Central People's BS. Chinese. (Tent) Interval signal to mellow sounding country & western style music. Talk was muffled and weak. (Boulden, CA)

1550 UTC on 11750
QATAR: Qatar BC Svc. Arabic programming of music and features to station ID. News format at 1600. (Howard J. Moser, Lincolnshire, IL)

1554 UTC on 9705
MEXICO: Radio Mexico Int'l. Spanish/English. Romantic ballads to program preview. Station ID at 1556 to announcer's chat. Music program to "canned" ID/kHz quote and Mexico City address (Apartado Postal 21-300, 04 201 Mexico D.F., Mexico). Program feature *William Carlos William* to English programming. (Lee Silvi, OH)

1604 UTC on 15240
SOUTH AFRICA: Channel Africa. News topics on traffic offenders in S. Africa. Tourism report on Egypt and Somalian conflicts with Ethiopia. (Boulden, CA)

1634 UTC on 11840
NORWAY: Radio Norway Int'l. Norwegian. Male/female announcers with national finance report. (Moser, IL; Fraser, MA)

1651 UTC on 6895.3
PERU: Radio San Miguel. Spanish. Peruvian music to station ID as, "Y ya van hacer las 12 del dia y como siempre por su radio San Miguel Arcanagel...onda internacional, uniendo todo el norte del pais." (Arrunategui, Peru, *TFW*)

1757 UTC on 5021.5
NIGER: La Voix du Sahel. African drums to male announcer speaking in Hausa at 1800.(Liangas, Greece, *TFW*).

1759 UTC on 5009.6
MADAGASCAR: RTV Malagasy. French/Vern. French pops to "Radio Madagascar" ID. Multilingual newscast with fair signal quality. (Bernardini, Italy/TFW) **Radio Netherland's Madagascar** relay noted on 1900 at 9605. (Fraser, MA)

1835 UTC on 15265
BRAZIL: Radio Nacional do Brasil. Text on Amazon research. Lite Brazilian rhythms. (Moser, IL) German service sign-on with ID/address on 15265 at 1930. (Fraser, MA)

1930 UTC on 9022
IRAN: VOIRI. Arab song to English ID and frequency quote. Newscast read by lady announcer. (Fraser, MA)

1942 UTC on 11734.1
TANZANIA: Voice of Tanzania. Swahili. Arabic style music to announcer's chat. Station sign-off at 2000. Fair signal quality. (Bernardini, Italy/*TFW*).

2018 UTC on 7465
ISRAEL: Kol Israel. Report on *Ethnic Music Week* and other music festivals in the nation. Heard on //9435, 9635. (Fraser, MA)

2045 UTC on 7335
BULGARIA: Radio Bulgaria. *Cultural Review* covers a project to publish French classics into Bulgarian. Noted on //9700. (Fraser, MA) Descriptions on the Bulgarian landscapes at 2150 on 11720. (Wilden, IN)

2110 UTC on 7195.2
ROMANIA: Radio Romania Int'l. English service to Europe noted with *World of Culture*. Also noted on //7105, //5990 with BBC's Russian interference. (Stokes Schwartz, Madison, WI)

2234 UTC on 6085
GERMANY: Bayerischer Rundfunk. German. Domestic service with enjoyable music program. Germany's **Sudwestfunk** noted on 7264.7 in German at 0830. (Schwartz, WI; Larry Van Horn, Brasstown, NC)

2245 UTC on 5940
RUSSIA: Voice of Russia. *Newmarket* program interviews a Russian woman who is an international investor. Heard on //9630, 7440, 7400. (Fraser, MA) Prayers to St. Elizabeth on 7125 at 2358. (Wilden, IN)

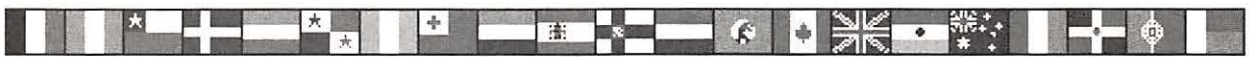
2359 UTC on 5895
CROATIA: Croatian Radio. English news bulletin to 0003, noted on //7165. (Schwartz, WI)

2324 UTC on 5323
PERU: Radio Origen. Spanish/Quecha. (Tent) Very weak signal with bits of audio peaks. Tentative logging on Peru's **Radio San Nicolas**, heard on several late evenings. **Radio Sudamerica** in Cutervo noted on 5522 at 2330, with high energy soccer play-by-play. Local commercial break. (DeYoung, VA) Peru's **Radio Atlantida** noted on 4790 at 0000-0027. (Veldhuis, Netherlands).

Thanks to our contributors — Have you sent in YOUR logs?
Send to ***Gayle Van Horn,*** *c/o Monitoring Times (or e-mail gayle@grove.net)*
English broadcast unless otherwise noted.

Gayle Van Horn, gayle@grove.net

Try the Diplomatic Approach!



So, you've tried multiple reports to Radio Zwollerkerspel, using every known address in all the guides ... and still no response? Have you sent innumerable enclosures of IRCs, mint stamps, and currency? The SASE and all-out pleading didn't help? Not to mention the time you sent a family photo! Does the thought of what you've spent on international postage make you feel faint?

When you've reached your limit of frustration, try the diplomatic approach! This proven verification method is not as far-out as you might think. By writing the embassy of the country in question a polite letter, explaining your hobby and what a QSL is (and providing return postage), I have found most embassy personnel to be cooperative and helpful.

To assist you in your embassy address search, The Electronic Embassy **<http://www.embassy.org/>** is now online. This excellent website provides information and addresses on all foreign embassies on the World Wide Web, including resources of the Washington, DC, embassy community. The Help and Reference Center provides help for users of the Electronic Embassy, including a Frequently Asked Questions (FAQ) section with E-mail embassy addresses and more. So, if Radio Zwollerkerspel *still* hasn't answered...try the diplomatic approach!

AIRCRAFT TRAFFIC

P2-ANN-De Havilland DHC-7, 6622 kHz USB; P2-ANF-Fokker F28 MK1000, 6622 kHz USB; P2-ANE-Fokker F28 MK1000. Three full-data prepared QSL cards returned as verified. Received for English utility reports of aircraft traffic takeoff clearance & enroute to Port Moresby. QSL address: Air Niugini, Chief Pilot., P.O. Box 7186, Boroko, NCD, Papua New Guinea. (Steve Mc Donald-VE7SL, Mayne Bay, BC Canada/*World Utility News* via email)

Air France-157, 5670 kHz USB. Full data prepared QSL card verified by M. Duboulay. Received in 26 days for an English utility report of aircraft traffic from Singapore enroute to Paris. QSL address: 45 rue de Paris, F-75757 Roissy CDG cedex, France. (McDonald, CAN/*WUN*).

Swiss Air-187, 5670 kHz USB. Full data prepared QSL card verified. Received in 12 days for an English utility report of aircraft traffic from Singapore enroute to Zurich. QSL address: Attention:Flight Operations (OCSC), Postfach CH-8058, Zurich-Flughafen, Switzerland. (McDonald, CAN)

ANDAMAN ISLANDS

All India Radio via Port Blair, 4760 kHz. Full data QSL card. Received in 210 for an English report. Sent to Port Blair address, QSL received from New Delhi. Station address: Parliment Street, P.O. Box 500, New Delhi-110 001, India. (N. Reiner, Germany/*The Four Winds* via email).

BOLIVIA

Radio Santa Cruz, 6135 kHz. Partial data letter signed by Maria Yolanda Marco-Directora. Station sticker and pennant enclosed. Received in 17 days for a Spanish report. Station address: Emisora del Instituto Radiofonico Fe y Alegria (IRFA), Casilla 672, Santa Cruz, Bolivia. (W. Mola, Italy/*TFW*).

BRAZIL

Radio Transmundial via Radio Nova Visao, 11705 kHz. Full data card signed by Jose Eduardo Dias-Gerente. Received for a Portuguese report. Station address: Caixa Postal 18300, Sao Paulo, SP 04699-970 Brazil. (J. Moacir Portera De Melo, Brazil/*TFW*).

Radio Cancao Nova, 4825 kHz. Full data QSL card signed by Claudia Santana. Received for a Portuguese report. Station address: Caixa Postal 15, 12630 Cachoeira Paulista, Sao Paulo, SP Brazil. (J.Souza Rodriguez, Brazil,/*TFW*).

CANADA

VAI-Vancouver Coast Guard Radio, 4384 kHz USB. Full data QSL card signed by Walter S. Mansz-Officer in Charge. Received in 347 days for an English utility report and two IRCs. Station address: 109-4611 Cowley Crescent, Richmond, BC Canada V7B 1B9 (Terry Jones, Plankinton, SD)

GABON

Radiodiffusion TV Gabonaise, 4777 kHz. Full data verification on station letterhead, signed by Technique Directeur. Received in 133 days. Station address: Boite Postal 10 150, Libreville, Gabon. (Don N. Aspinall, Toano, VA) Full data letter received in 75 days, signed by Ranaud Gotthardt, with one U.S. dollar. (Matthias Gatzke, Germany/*TFW*).

MEDIUMWAVE

WNRB 1510-AM. Full data verification on station letterhead, signed by Rose Miller. Program Guide and Station Profile sheets enclosed. Received in 210 days for an English AM report. Station address: 500 West CummingsPark, Suite 2500, Woburn, MA 01801. (R. George Knight, Garfield, NJ)

NON-DIRECTIONAL BEACONS

RLS, 264 kHz Westerly, Rhode Island. Full data prepared QSL card returned as verified by James Beauregard-Airport Manager. Received for an English utility report and mint stamps. Station address: Westerly State Airport, Westerly, RI 02891. (Hank Holbrook, Dunkirk, MD)

IHM, 220 kHz Mansfield, Massachusetts. Full data prepared QSL card returned as verified by Airport Manager. Received for an English utility report and mint stamps. Station address: Mansfield Municipal Airport, Mansfield, MA 02048. (Holbrook, MD)

SXD-265 kHz Springfield, Vermont. Full data prepared QSL card returned as verified by R. Knots. Received for an English utility report and mint stamps. Station address: Kem Aviation, Inc., Springfield State Airport, Route 2-Box 88, North Springfield, VT 05150. (Holbrook, MD)

YOG-300 kHz Ogoki Post, Ontario. Full data prepared QSL card returned as verified by B.M. Davies-Regional Director Technical Services-Ontario Region. Received for an English utility report and mint stamps. Station address: Transport Canada, Technical Services, 4900 Yonge Street, Suite 300, Willowdale, ONT Canada M2N 6A5. (Holbrook, MD)

YXL-346 kHz Sioux Lookout, Ontario. Full data prepared QSL card returned as verified by Robert L. Kellow-Regional Maintenance Officer. Received for an English utility report and mint stamps. Station address: Transport Canada, 11th Floor, 333 Main Street, P.O. Box 8550, Winnipeg, MB, Canada R3C 0P6 (Holbrook, MD)

HEG-Jacksonville, Florida. Full data prepared QSL card returned as verified by Tommy L. Jones. Received for an English utility report and mint stamps. Station address: Jacksonville Port Authority, P.O. Box 3005, 2831 Telleyrand Avenue, Jacksonville, FL 32206-0005. Additional address: Herlong Airport, 8977 Herlong Road, Jacksonville, FL 32210. (Holbrook, MD)

RJD-226 kHz Ridgely, Maryland. Full data prepared QSL card returned as verified by Thomas R. Davis. Received for an English utility report and mint stamps. Station address: Ridgely Airpark, Ridgely, MD 21660. (Holbrook, MD)

PERU

Radio Satelite, 6725 kHz. Full data QSL card stamped with station seal, signed by Sabino Llano Chavez, plus a lengthy personal letter from veri signer in Spanish. Received in 33 days for an English report and one U.S. dollar. Station address: Jiron Cutervo 543, Provincia De Santa Cruz, Cajamarca, Peru. (Richard W. Parker, Rochester, NY).

How to Use the Shortwave Guide

1: Convert your time to UTC.

Eastern and Pacific Times are already converted to Coordinated Universal Time (UTC) at the top of each page. The rule is: convert your local time to 24-hour format; add (during Standard Time) 5,6,7, or 8 hours for Eastern, Central, Mountain or Pacific Times, respectively.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (7:30 pm Eastern, 4:30 pm Pacific).

2: Choose a program or station you want to hear.

Some selected programs appear on the lower half of the page for prime listening hours—space does not permit 24-hour listings.

Occasionally program listings will be followed by "See X 0000." This information indicates that the program is a rerun, and refers to a previous summary of the program's content. The letter stands for a day of the week, as indicated below, and the four digits represent a time in UTC.

S: Sunday T: Tuesday H: Thursday A: Saturday
M: Monday W: Wednesday F: Friday

3: Find the frequencies for the program or station you want to hear.

Look at the page which corresponds to the time you will be listening. Comprehensive frequency information for English broadcasts can be found at the top half of the page. All frequencies are in kHz.

The frequency listing uses the same day codes as the program listings; if a broadcast is not daily, those day codes will appear before the station name. Irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

4: Choose the most promising frequencies for the time, location and conditions.

Not all stations can be heard and none all the time on all frequencies. To help you find the most promising frequency, we've included information on the target area of each broadcast. Frequencies beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible. Every frequency is followed by one of these target codes:

am:	The Americas	as:	Asia
na:	North America	au:	Australia
ca:	Central America	pa:	Pacific
sa:	South America	va:	various
eu:	Europe	do:	domestic broadcast
af:	Africa	om:	omnidirectional
me:	Middle East		

Consult the propagation charts. To further help you find the right frequency, we've included charts at the back of this section which take into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the region in which you live and find the chart for the region in which the station you want to hear is located. The chart indicates the optimum frequencies for a given time in UTC.

Hot News

Programming Tips by Jim Frimmel

Newsworthy Australia

In reaction to concern about its future and to provide improved regional coverage, Radio Australia has once again changed its program format. Since January 20th, the emphasis has been on more news and less music. Weekday programming now includes an hour of news every three hours. News at the top of each hour is tailored for either Asian, Australian, Pacific, or world listeners, depending on the target area. Some programs have been dropped, notably *International Report*. See the centerfold section for Australia program listings and the worldwide web at **www.abc.net.au/ra/elp/rahome.htm** for details.

Belgians Feel the Pinch

Radio Vlaanderen International (RVI) will reduce its output beginning with the fall/winter 1997 season. All broadcasts in Spanish, German and Arabic will be eliminated. The remaining languages (Dutch, French, and English) are expected to undergo schedule and format changes as the present level of 300 hours per week is cut to 140 hours. These cost-saving reforms will also result in employee reductions. Internet broadcasting via the World Radio Network is expected to fill the void resulting from this downsizing.

Peeking into China

China Radio Int'l introduced two new programs: *Chinese Folktales* tells about the traditions, moral values, etiquette, and customs of this ancient country and relates stories about both historical and legendary figures of China (Sats from 1200 UTC). *Changzhou Reports* takes a look at Changzhou, an industrial city in East China's Jiangsu Province that supports Shanghai's Pudong New Development Zone (first heard at 1239 Mondays).

France, India Put Audio on the Web

Radio France International's updated internet site (**www.rfi.fr**) now provides in RealAudio format all programs broadcast in French over the last 24 hours. Some programs in Spanish and English are said to be available.

All India Radio (AIR) is now broadcasting real-time audio on the internet (**www.kode.net**). The pilot service offers current affairs, music, drama, speeches, talks, and discussions in English and native languages.

German Technology Programs

Deutsche Welle announced a new hi-tech program called *What's New?* in its broadcasts on Monday and Friday. The program will consist of these rotating science programs: *MediaMag*, *Made in Germany*, *Headcrash*, and *Science and Technology*. *MediaMag*—the newest entry—will cover the internet, digital broadcasting, satellites, and new media technology. *Made in Germany* is a revamped program dealing with new German products and business ideas. The other two programs will continue with few changes.

Investment Advice to Africa

The Investment Channel, a new commercial broadcaster, began operation in late January via Sentech's state-of-the-art facilities. Programs provide investment advice and are produced in Atlanta and fed by satellite for broadcast to some 41 countries in Africa. All broadcasts are in English. The program producers are also investment bankers, brokers, and dealers who believe there is untapped wealth in the continent. Check for transmissions to West Africa at 0530-0800 on 11985/15225, 1130-1400 on 17735/21745, and 1800-2200 on 15420/17890. See the web site at **www.sentech.co.za/invest.html** for a complete schedule.

USA (WINB)

By the time you read this you should be able to receive station WINB, World International Broadcasters, of Red Lion, Pennsylvania. The station ceased operation about two years ago. Its format is expected to be religious and can be heard from 1700-1900 on 15715, 1900-2200 on 11740, and 2200-0300 on 11950. Before it went off the air, the station had been mainly a conduit for right-wing patriot and militia programs, not unlike some currently heard on WGTG.

Frequencies

0000-0030	Australia, Radio	13605pa	15510as	17750as	
0000-0100 vl	Australia, VL8K Katherine	5025do			
0000-0100 vl	Australia, VL8T Tent Crk	4910do			
0000-0100	Bulgaria, Radio	7375na	9485na		
0000-0015	Cambodia, Natl Voice of	11940as			
0000-0100	Canada, CBC N Quebec Svc	9625do			
0000-0100	Canada, CFCX Montreal	6005do			
0000-0100	Canada, CFRX Toronto	6070do			
0000-0100	Canada, CFVP Calgary	6030do			
0000-0100	Canada, CHNX Halifax	6130do			
0000-0100	Canada, CKZN St John's	6160do			
0000-0100	Canada, CKZU Vancouver	6160do			
0000-0100	Canada, R Canada Intl	5960am	9755am		
0000-0030	Canada, R Canada Intl	6040am	9535am	11940am	
0000-0100	China, China Radio Intl	9710na	11760na		
0000-0100 vl	Costa Rica, Adv World R	7375am	9725am	13750am	15460am
0000-0100	Costa Rica,RF Peace Intl	6205am	7385am		
0000-0027	Czech Rep, Radio Prague	5930na	7345na		
0000-0100	Ecuador, HCJB	9745am	21455am		
0000-0030	Egypt, Radio Cairo	9900na			
0000-0015 vl	Ghana, Ghana Broadc Corp	3366do	4915do		
0000-0045	India, All India Radio	7150as	9705as	9950as	11620as
0000-0100	Lebanon, Voice of Hope	9960va			
0000-0100	Liberia,LCN/R Liberia Int	5100do			
0000-0100	Malaysia, Radio	7295do			
0000-0100	Malaysia, RTM Kuching	7160do			
0000-0100	Netherlands, Radio	6020na	6165na		
0000-0100	New Zealand, R NZ Intl	15115pa			
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na	
0000-0100 vl	Papua New Guinea, NBC	9675do			
0000-0100	Russia,Voice of Russia WS	5940na	7105eu	7125na	7180na
0000-0100	Spain, R Exterior Espana	6055am			
0000-0030	Thailand, Radio	9680af			
0000-0100	Ukraine, R Ukraine Intl	5905eu	5940eu	6010eu	6020eu
		7180na	7205eu	7290eu	
0000-0100	United Kingdom, BBC WS	5965as	5970am	5975am	6175am
		6195as	9410as	9515am	9590am
		9915am	11750sa	11955as	15280as
		15360as			
0000-0030	United Kingdom, BBC WS	7110as	9580as	11945as	
0000-0100	USA, KAIJ Dallas TX	5810am			
0000-0100	USA, KTBN Salt Lk City UT	7510am			
0000-0100	USA, KWHR Naalehu HI	17510as			
0000-0100	USA, Monitor Radio Intl	7535na	9430sa	13840as	
0000-0100	USA, Voice of America	7215as	9890as	11760as	15290am
		17735am	17820as		
0000-0100 twhfa	USA, Voice of America	5995am	6130am	7405am	9455am
		9775am	13740am		
0000-0100	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0000-0100	USA, WGTG McCaysville GA	5085am			
0000-0100	USA, WHRI Noblesville IN	5745am	7315am		
0000-0100	USA, WJCR Upton KY	7490na			
0000-0100 mtwhf	USA, WRMI/R Miami Intl	9955am			
0000-0100	USA, WRNO New Orleans LA	7355am			
0000-0100 mtwhf	USA, WVHA Greenbush ME	9900af			
0000-0100	USA, WWCR Nashville TN	3215am	5070am	5935am	
0000-0045	USA, WYFR Okeechobee FL	6085na	11855ca		
0030-0100	Australia, Radio	9660pa	11640as	12080pa	13605pa
		13755pa	15365pa	17715as	17750as
		17795pa	17860pa		
0030-0055	Austria, R Austria Intl	7325na			
0030-0055	Belgium, R Vlaanderen Int	5900na	9925sa		
0030-0100	Iran, VOIRI	6050na	9022na	9685na	
0030-0100	Lithuania, Radio Vilnius	5890na	6120na		
0030-0100	Netherlands, Radio	5905as	7305as		
0030-0100	Sri Lanka, Sri Lanka BC	9730as			
0030-0100	Sweden, Radio	6065am			
0030-0100	Thailand, Radio	9655as	11905as		
0035-0040	India, All India Radio	4860do	5050do	7110do	11830do
		11870do			
0050-0100	Italy, RAI Intl	6010na	9675na	11800na	

Selected Programs

Sundays

0000 Australia, Radio: World News. Ten minutes of news from around the world.
0000 KWHR (Hawaii): Prophetic Voice Broadcast. A program from Gospel Truth Ministries of Cincinnati.
0000 WHRI (Angel 1): Music. Contemporary christian music and inspiration.
0000 WHRI (Angel 2): The Prophecy Club. Stan Johnson discusses bible prophecy from Topeka, Kansas.
0010 Australia, Radio: Charting Australia. A program intended to strengthen Australia's links with India and to present the issues of the subcontinent.
0030 Australia, Radio: Correspondents' Report. A round-up of global stories with Hamish Robertson.

Mondays

0000 Australia, Radio: World News. See S 0000.
0000 WHRI (Angel 2): Tomorrow's News Today. George Hyatt is the presenter.
0010 Australia, Radio: Dateline Early Edition. Twenty-two minutes of background to the news.
0015 WHRI (Angel 2): Music. See S 0000.
0022 Australia, Radio: Sports Bulletin. See S 1120.
0030 Australia, Radio: News Headlines. See S 2330.
0030 WHRI (Angel 2): The Prophecy Club. See S 0000.
0031 Australia, Radio: Innovations. Desley Blanch reports on Australian inventions and innovative practices.

Tuesdays

0000 Australia, Radio: World News. See S 0000.
0000 KWHR (Hawaii): USA Radio News. See M 0200.
0000 WHRI (Angel 1): UPI News. See S 0400.
0005 KWHR (Hawaii): People to People (live). See T 0005.
0005 WHRI (Angel 1): Music. See S 0000.
0005 WHRI (Angel 2): People to People (live). A program offering practical scriptural insights with Bob George.
0010 Australia, Radio: Dateline Early Edition. See M 0010.
0022 Australia, Radio: Sports Bulletin. See S 1120.
0030 Australia, Radio: News Headlines. See S 2330.
0031 Australia, Radio: Arts Australia. Lisa Harris presents reviews and comment on current events within the Australian arts scene.

Wednesdays

0000 Australia, Radio: World News. See S 0000.
0000 KWHR (Hawaii): USA Radio News. See M 0200.
0000 WHRI (Angel 1): UPI News. See S 0400.
0000 WHRI (Angel 2): USA Radio News. See M 0200.
0005 KWHR (Hawaii): People to People (live). See T 0005.
0005 WHRI (Angel 1): Music. See S 0000.
0005 WHRI (Angel 2): People to People (live). See T 0005.
0010 Australia, Radio: Dateline Early Edition. See M 0010.
0022 Australia, Radio: Sports Bulletin. See S 1120.
0030 Australia, Radio: News Headlines. See S 2330.
0031 Australia, Radio: Science File. Ian Wood examines the world of science, medicine and technology.

Thursdays

0000 Australia, Radio: World News. See S 0000.
0000 KWHR (Hawaii): USA Radio News. See M 0200.
0000 WHRI (Angel 1): UPI News. See S 0400.
0000 WHRI (Angel 2): USA Radio News. See M 0200.
0005 KWHR (Hawaii): People to People (live). See T 0005.
0005 WHRI (Angel 1): Music. See S 0000.
0005 WHRI (Angel 2): People to People (live). See T 0005.
0010 Australia, Radio: Dateline Early Edition. See M 0010.
0022 Australia, Radio: Sports Bulletin. See S 1120.
0030 Australia, Radio: News Headlines. See S 2330.
0031 Australia, Radio: Book Talk. Jill Kitson presents an entertaining mix of reviews and critical discussion of new books.
0054 Radio Netherlands: Documentary. Andorra: The Mini State (13th). See A 2354.
0054 Radio Netherlands: Documentary. From the Wireless to the World Wide Web: Part 2 (6th). See W 1254.
0054 Radio Netherlands: Documentary. The Eleventh Insight (20th). See F 1454.
0054 Radio Netherlands: Documentary. The Marshall Plan (27th). See F 2354.

Fridays

0000 Australia, Radio: World News. See S 0000.
0000 KWHR (Hawaii): USA Radio News. See M 0200.
0000 WHRI (Angel 1): UPI News. See S 0400.
0000 WHRI (Angel 2): USA Radio News. See M 0200.
0005 KWHR (Hawaii): People to People (live). See T 0005.
0005 WHRI (Angel 1): Music. See S 0000.
0005 WHRI (Angel 2): People to People (live). See T 0005.
0010 Australia, Radio: Dateline Early Edition. See M 0010.
0022 Australia, Radio: Sports Bulletin. See S 1120.
0030 Australia, Radio: News Headlines. See S 2330.
0031 Australia, Radio: The Words to Say It. Stephen Godley presents a program about the personal beliefs and ideas of a wide range of women, men and young people.

Saturdays

0000 Australia, Radio: World News. See S 0000.
0000 KWHR (Hawaii): USA Radio News. See M 0200.
0000 WHRI (Angel 1): UPI News. See S 0400.
0000 WHRI (Angel 2): USA Radio News. See M 0200.
0005 KWHR (Hawaii): People to People (live). See T 0005.
0005 WHRI (Angel 1): Music. See S 0000.
0005 WHRI (Angel 2): People to People (live). See T 0005.
0010 Australia, Radio: Feedback. See S 0410.
0030 Australia, Radio: Indian Pacific. News and analysis from across the Pacific and Asia.

Frequencies

0100-0200	Australia, Radio	9660pa	11640as	13755pa	15240pa
		15365pa	15415as	15510as	17715as
		17750pa	17795pa	17880pa	
0100-0200 vl	Australia, VL8K Katherine	5025do			
0100-0200 vl	Australia, VL8T Tent Crk	4910do			
0100-0200 vl	Canada, CBC N Quebec Svc	9625do			
0100-0200	Canada, CFCX Montreal	6005do			
0100-0200	Canada, CFRX Toronto	6070do			
0100-0200	Canada, CFVP Calgary	6030do			
0100-0200	Canada, CHNX Halifax	6130do			
0100-0200	Canada, CKZN St John's	6160do			
0100-0200	Canada, CKZU Vancouver	6160do			
0100-0200	Costa Rica,RF Peace Intl	6205am	7385am		
0100-0200	Cuba, Radio Havana	6000na	9820na	9830na	
0100-0127	Czech Rep, Radio Prague	6200na	7345na		
0100-0200	Ecuador, HCJB	9745am	21455am		
0100-0150	Germany, Deutsche Welle	5960na	6040na	6085na	6145na
		9640na			
0100-0115	Ghana, Ghana Broadc Corp	3366do	4915do		
0100-0200	Indonesia, Voice of	9525na			
0100-0128	Iran, VOIRI	6050na	9022na		
0100-0200 t/h	Ireland,W Coast R Ireland	5910am			
0100-0110	Italy, RAI Intl	6010na	9675na	11800na	
0100-0200	Japan, R Japan/NHK World	11790as	11840as	11860as	11890na
		13630am	13650as	15475as	17685as
		17810as			
0100-0130	Kazakhstan, Radio Almaty	6230eu			
0100-0200	Lebanon, Voice of Hope	9960va			
0100-0200	Liberia,LCN/R Liberia Int	5100do			
0100-0200 smtwh	Malaysia, Radio	7295do			
0100-0125	Netherlands, Radio	6020na	6165na		
0100-0200	Netherlands, Radio	5905as	7305as		
0100-0200	New Zealand, R NZ Intl	15115pa			
0100-0200 vl	Papua New Guinea, NBC	9675do			
0100-0200	Philippines, FEBC/R Intl	15450as			
0100-0200	Russia,Voice of Russia WS	7105na	7125na	7240na	9550na
0100-0130	Slovakia, R Slovakia Intl	5930na	7300na	9440na	
0100-0200	Spain, R Exterior Espana	6055am			
0100-0200	Sri Lanka, Sri Lanka BC	9730as			
0100-0130	Switzerland, Swiss R Intl	6135na	9885na	9905ca	
0100-0200	Ukraine, R Ukraine Intl	5915na	7150na	7160na	7180na
		7205na	7290na		
0100-0200	United Kingdom, BBC WS	5965as	5970sa	5975am	6175am
		6195as	9410as	9515am	9590am
		9915am	11750am	11955as	15280as
		15360as			
0100-0200	USA, KAIJ Dallas TX	5810am			
0100-0200	USA, KTBN Salt Lk City UT	7510am			
0100-0200	USA, KWHR Naalehu HI	17510au			
0100-0200	USA, Monitor Radio Intl	7535na	9430am		
0100-0200	USA, Voice of America	7115as	7205as	9455am	9740as
		11705as	15250as	15370as	17740as
		21550as			
0100-0200 twhfa	USA, Voice of America	5995am	6130am	7405am	9775am
		13740am			
0100-0200	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0100-0200	USA, WGTG McCaysville GA	5085am			
0100-0200	USA, WHRI Noblesville IN	5745am	7315am		
0100-0200	USA, WJCR Upton KY	7490na			
0100-0200 mtwhf	USA, WRMI/R Miami Intl	9955am			
0100-0130 s	USA, WRMI/R Miami Intl	9955am			
0100-0200	USA, WRNO New Orleans LA	7355am			
0100-0200	USA, WWCR Nashville TN	2390am	3215am	5070am	5935am
0100-0200	USA, WYFR Okeechobee FL	6065na	9505na		
0100-0130	Uzbekistan, R Tashkent	5955eu	5975eu	7285eu	
0100-0126	Vietnam, Voice of	5940na			
0100-0130 mtwhfa	Yugoslavia, Radio	6195na	7115na		
0115-0130 f	Greece, Voice of	6125na	7448na	9420na	
0130-0150	Greece, Voice of	6125na	7448na	9420na	
0130-0200 s/vl	Malta, VO Mediterranean	15550as	17570au		
0130-0200	Netherlands, Radio	9860as	11655as		
0130-0200	Sweden, Radio	7265am	7290am		
0130-0156	Vietnam, Voice of	5940na			
0140-0200	Vatican State, Vatican R	5980as	7335as		
0145-0200	Albania, R Tirana Intl	6115na	7160na		
0150-0200	Germany, Deutsche Welle	5960na	6085na		

Selected Programs

Sundays

0100 Australia, Radio: World News. See S 0000.
0100 Germany, Deutsche Welle: World News. Eight minutes of world news from Deutsche Welle.
0100 KWHR (Hawaii): The Water of Life Broadcast. Doyle Davidson preaches from Plano, Texas.
0100 WHRI (Angel 2): Open Bible Dialog. Joseph Chambers takes listeners' phone calls.
0108 Germany, Deutsche Welle: Inside Europe. A radio magazine offering a European perspective on events of the week.
0110 Australia, Radio: The Europeans. Maria Zijlstra presents reports and features on aspects of European politics, culture and society.
0138 Germany, Deutsche Welle: Mailbag. Listener mail from the Americas is answered.

Mondays

0100 Australia, Radio: World and Australian News. See S 1100.
0100 Germany, Deutsche Welle: World News. See S 0100.
0100 WHRI (Angel 2): Turn Your Radio On. See S 0300.
0108 Germany, Deutsche Welle: Arts on the Air. Reports and interviews on major cultural events and developments.
0110 Australia, Radio: Dateline. Fifty minutes of overseas and local correspondent reports and analyses of regional and global issues and events, including business news.
0130 KWHR (Hawaii): Christ Gospel Broadcast. See S 1300.
0133 Germany, Deutsche Welle: German by Radio. An advanced German language course for English speakers.

Tuesdays

0100 Australia, Radio: World and Australian News. See S 1100.
0100 Germany, Deutsche Welle: World News. See S 0100.
0100 KWHR (Hawaii): Turn Your Radio On. See S 0300.
0100 WHRI (Angel 2): Jack McLamb Show (live). Jack McLamb.
0109 Germany, Deutsche Welle: European Journal. A review of major events in Europe and Germany through interviews, analyses and background reports.
0110 Australia, Radio: Dateline. See M 0110.
0133 Germany, Deutsche Welle: Living in Germany. A weekly look at the social and political issues in the 1990s.

Wednesdays

0100 Australia, Radio: World and Australian News. See S 1100.
0100 Germany, Deutsche Welle: World News. See S 0100.
0100 KWHR (Hawaii): Music. See S 0000.
0100 WHRI (Angel 2): Jack McLamb Show (live). See T 0100.
0109 Germany, Deutsche Welle: European Journal. See T 0109.
0110 Australia, Radio: Dateline. See M 0110.
0133 Germany, Deutsche Welle: Come to Germany. Focus on a seasonal event, festival, or attraction.

Thursdays

0100 Australia, Radio: World and Australian News. See S 1100.
0100 Germany, Deutsche Welle: World News. See S 0100.
0100 KWHR (Hawaii): Music. See S 0000.
0100 WHRI (Angel 2): Jack McLamb Show (live). See T 0100.
0109 Germany, Deutsche Welle: European Journal. See T 0109.
0110 Australia, Radio: Dateline. See M 0110.
0133 Germany, Deutsche Welle: German Tribune. News and views from the Federal Republic.

Fridays

0100 Australia, Radio: World and Australian News. See S 1100.
0100 Germany, Deutsche Welle: World News. See S 0100.
0100 KWHR (Hawaii): Music. See S 0000.
0100 WHRI (Angel 2): Jack McLamb Show (live). See T 0100.
0109 Germany, Deutsche Welle: European Journal. See T 0109.
0110 Australia, Radio: Dateline. See M 0110.
0133 Germany, Deutsche Welle: Headcrash (1). Wilfried Solbach with news about computers for PC, Apple, and Amiga techies.
0133 Germany, Deutsche Welle: Made in Germany (4). Iwe Hessler reports on new German products and business ideas.
0133 Germany, Deutsche Welle: MediaMag (3). Host Hardy Graupner reports on what's new in the fields of digital broadcasting, the Internet, and satellite technology.
0133 Germany, Deutsche Welle: Science and Technology (2). Magazine program presenting new developments in these fields.

Saturdays

0100 Australia, Radio: World News. See S 0000.
0100 Germany, Deutsche Welle: World News. See S 0100.
0100 KWHR (Hawaii): Home Schooling. Terry and Vicki Brady of the Home Education network take calls about schooling.
0100 WHRI (Angel 2): Jack McLamb Show (live). See T 0100.
0108 Germany, Deutsche Welle: European Journal. See T 0109.
0110 Australia, Radio: Oz Sounds #1. See S 1510.
0130 Australia, Radio: Australia Today. See S 1130.
0131 Germany, Deutsche Welle: Through German Eyes. In-depth interviews with prominent German journalists.
0154 Radio Netherlands: Documentary. Andorra: The Mini State (15th). Jonathan Groubert travels to one of the hidden treasures of Europe to unveil its mysteries.
0154 Radio Netherlands: Documentary. From the Wireless to the World Wide Web: Part 2 (8th). See W 1254.
0154 Radio Netherlands: Documentary. The Eleventh Insight (22st). See F 1454.
0154 Radio Netherlands: Documentary. The Marshall Plan (29th). See F 2354.

Hauser's Highlights

***BANGLADESH:* Bangladesh Betar,** features after *News* and *News Commentary*:

Sat	*Economic Review.*
Sun	*Press Comments.*
Mon	*Panorama.*
Tue	*Sports Review.*
Wed	*Press Comments.*
Thu	*Panaroma [sic].*
Fri	*From Us to You*—replies to listeners.

These are on the 1230-1300 broadcast on 7185, 9550; 1815-1900 on same plus 15520 .
(via B. Cooley, BC)

Frequencies

0200-0300	Anguilla,Caribbean Beacon	6090am			
0200-0300 t-h/vl	Argentina, RAE	11710am			
0200-0300 t-h	Australia, Radio	9660pa	11640as	11695as	12080pa
		13605pa	13755pa	15240pa	15365pa
		15415as	17715as	17750pa	17795pa
		17880pa			
0200-0300 vl	Australia, VL8K Katherine	5025do			
0200-0300 vl	Australia, VL8T Tent Crk	4910do			
0200-0300	Canada, CBC N Quebec Svc	9625do			
0200-0300	Canada, CFCX Montreal	6005do			
0200-0300	Canada, CFRX Toronto	6070do			
0200-0300	Canada, CFVP Calgary	6030do			
0200-0300	Canada, CHNX Halifax	6130do			
0200-0300	Canada, CKZN St John's	6160do			
0200-0300	Canada, CKZU Vancouver	6160do			
0200-0300	Canada, R Canada Intl	5765am	6010am	9535am	9755am
		11725am			
0200-0300	Costa Rica,RF Peace Intl	6205am	7385am		
0200-0300	Cuba, Radio Havana	6000na	9820na	9830na	
0200-0300	Ecuador, HCJB	9745am	21455am		
0200-0300	Egypt, Radio Cairo	9475na			
0200-0250	Germany, Deutsche Welle	6035as	7265as	7285as	7355as
		9515as	9615as		
0200-0230	Hungary, Radio Budapest	5905na	9840na		
0200-0300 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0200-0300	Lebanon, Voice of Hope	9960va			
0200-0300 smtwh	Malaysia, Radio	7295do			
0200-0230 s/vl	Malta, VO Mediterranean	15550as	17570au		
0200-0300	Netherlands, Radio	9860as	11655as		
0200-0225	Netherlands, Radio	5905as	7305as		
0200-0300	New Zealand, R NZ Intl	15115pa			
0200-0230 m	Norway, Radio Norway Intl	7125as	7440na	7465na	
0200-0300 vl	Papua New Guinea, NBC	9675do			
0200-0300	Philippines, FEBC/R Intl	15450as			
0200-0300	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
0200-0300	Russia,Voice of Russia WS	5930na	7105na	7345na	9550na
		9580na	12030na	13665na	
0200-0300 mtwhfa	Russia,Voice of Russia WS	5920na			
0200-0225	S Africa, Investment Ch	6195me	7175me		
0200-0300	Slovakia, Adv World Radio	11610as			
0200-0300	South Korea, R Korea Intl	7275as	11725am	11810am	15575am
0200-0300	Sri Lanka, Sri Lanka BC	9730as			
0200-0300	Taiwan, VO Free China	5950na	7130as	9680na	11740ca
		11825as	15345as		
0200-0300	United Kingdom, BBC WS	5970sa	5975am	6135af	6175am
		9410na	9515am	9590am	9605as
		9915as	11955as	15280as	15360as
0200-0300	USA, KAIJ Dallas TX	5810am			
0200-0300	USA, KTBN Salt Lk City UT	7510am			
0200-0300	USA, KVOH Los Angeles CA	9975am			
0200-0300	USA, KWHR Naalehu HI	17510au			
0200-0300	USA, Monitor Radio Intl	5850na	7535am		
0200-0300	USA, Voice of America	7115as	7205as	9740as	11705as
		15250as	15370as	17740as	21550as
0200-0300	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0200-0300	USA, WGTG McCaysville GA	5085am			
0200-0300	USA, WHRI Noblesville IN	5745am	7315am		
0200-0300	USA, WJCR Upton KY	7490na			
0200-0300 mtwhf	USA, WRMI/R Miami Intl	9955am			
0200-0300	USA, WRNO New Orleans LA	7355am			
0200-0300 mtwhf	USA, WVHA Greenbush ME	5850eu			
0200-0300	USA, WWCR Nashville TN	2390am	3215am	5070am	5810am
0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
0200-0226	Vietnam, Voice of	5940na			
0200-0230	Yugoslavia, Radio	6195na	7130na		
0215-0225	Nepal, Radio	7165do			
0230-0300	Albania, R Tirana Intl	6140na	7160na		
0230-0259	Austria, R Austria Intl	7325na	9495sa	9870ca	
0230-0300 vl	Philippines, R Pilipinas	11855me	15120me	15270me	
0230-0255	S Africa, Investment Ch	6195me	7175me		
0230-0300	Sweden, Radio	6200na			
0230-0300	United Kingdom, BBC WS	7325am			
0230-0256	Vietnam, Voice of	5940na			
0245-0300	India, All India Radio	3945do	6045do	7110do	11830do
		15135do			
0245-0300	United Kingdom, BBC WS	15405as			
0245-0300	USA, WYFR Okeechobee FL	9355eu			
0250-0300	Vatican State, Vatican R	6095na	7305na		
0250-0300	Zambia, ZNBC Radio 2	6165do			

Selected Programs

Sundays

0200 Australia, Radio: World News. See S 0000.
0200 KWHR (Hawaii): Music. See S 0000.
0200 WHRI (Angel 2): Open Bible Dialog. See S 0100.
0210 Australia, Radio: Charting Australia. See S 0010.
0230 Australia, Radio: Correspondents' Report. See S 0030.
0230 KWHR (Hawaii): Living Faith Ministries. Bill Perg.
0245 KWHR (Hawaii): For God So Loved the World. Five minutes of evangelism by Linda Leon.

Mondays

0200 Australia, Radio: World News. See S 0000.
0200 KWHR (Hawaii): Methodist Hour. Music, interviews, and timely messages.
0200 WHRI (Angel 1^2): USA Radio News. A five-minute news bulletin.
0205 WHRI (Angel 1): Music. See S 0000.
0206 WHRI (Angel 2): Radio Free America (live). Tom Valentine hosts this talk/interview program.
0209 Australia, Radio: Sports Headlines. A one-minute sports update.
0210 Australia, Radio: The World Today. No information available.
0230 KWHR (Hawaii): The Voice of Power. RW Schambach preaches from Tyler, Texas.

Tuesdays

0200 Australia, Radio: World News. See S 0000.
0200 KWHR (Hawaii): UPI News. See S 0400.
0200 WHRI (Angel 2): The Prophecy Club. See S 0000.
0205 KWHR (Hawaii): Music. See S 0000.
0209 Australia, Radio: Sports Headlines. See M 0209.
0210 Australia, Radio: The World Today. See M 0210.
0230 WHRI (Angel 2): The Hour of Courage. See M 0500.

Wednesdays

0200 Australia, Radio: World News. See S 0000.
0200 KWHR (Hawaii): UPI News. See S 0400.
0200 WHRI (Angel 2): The Prophecy Club. See S 0000.
0205 KWHR (Hawaii): Music. See S 0000.
0209 Australia, Radio: Sports Headlines. See M 0209.
0210 Australia, Radio: The World Today. See M 0210.
0230 WHRI (Angel 2): The Hour of Courage. See M 0500.

Thursdays

0200 Australia, Radio: World News. See S 0000.
0200 KWHR (Hawaii): UPI News. See S 0400.
0200 WHRI (Angel 2): The Prophecy Club. See S 0000.
0205 KWHR (Hawaii): Music. See S 0000.
0209 Australia, Radio: Sports Headlines. See M 0209.
0210 Australia, Radio: The World Today. See M 0210.
0230 WHRI (Angel 2): The Hour of Courage. See M 0500.
0254 Radio Netherlands: Documentary. Andorra: The Mini State (13th). See A 2354.
0254 Radio Netherlands: Documentary. From the Wireless to the World Wide Web: Part 2 (6th). See W 1254.
0254 Radio Netherlands: Documentary. The Eleventh Insight (20th). See F 1454.
0254 Radio Netherlands: Documentary. The Marshall Plan (27th). See F 2354.

Fridays

0200 Australia, Radio: World News. See S 0000.
0200 KWHR (Hawaii): UPI News. See S 0400.
0200 WHRI (Angel 2): The Prophecy Club. See S 0000.
0205 KWHR (Hawaii): Music. See S 0000.
0209 Australia, Radio: Sports Headlines. See M 0209.
0210 Australia, Radio: The World Today. See M 0210.
0230 WHRI (Angel 2): The Hour of Courage. See M 0500.

Saturdays

0200 Australia, Radio: World News. See S 0000.
0200 KWHR (Hawaii): DXing with Cumbre. See S 0430.
0200 WHRI (Angel 2): The Prophecy Club. See S 0000.
0210 Australia, Radio: Pacific Focus #2. See S 0510.
0230 Australia, Radio: Indian Pacific. See A 0030.
0230 KWHR (Hawaii): Music. See S 0000.
0230 WHRI (Angel 2): The Hour of Courage. See M 0500.

Hauser's Highlights
South Africa: The Investment Channel

Atlanta, via SENTECH, planned to start by February. 25-minute transmissions to variety of targets in Africa, Mideast only, mostly 250 kW, some 500 or 100.

0200-0255	6195
0200-0325	7175
0300-0355	9775
0330-0625	11985
0400-0525	15225
0600-0725	9675
0600-0755	15225
0630-1855	17735
0800-1555	21745
0930-1225	11985
1800-1955	9675
1900-2025	15420
1900-2155	17890
2000-2055	7270

(SENTECH via Al Quaglieri)
Partly English, partly Swahili
(RN *Media Network*)

Frequencies

0300-0400	Anguilla,Caribbean Beacon	6090am			
0300-0400	Australia, Radio	9660pa	11640as	12080pa	13605pa
		13755pa	15240pa	15365pa	15415as
		15510as	17715as	17750pa	17795pa
		17880pa			
0300-0400 vl	Australia, VL8K Katherine	5025do			
0300-0400 vl	Australia, VL8T Tent Crk	4910do			
0300-0400 vl	Canada, CBC N Quebec Svc	9625do			
0300-0400	Canada, CFCX Montreal	6005do			
0300-0400	Canada, CFRX Toronto	6070do			
0300-0400	Canada, CFVP Calgary	6030do			
0300-0400	Canada, CHNX Halifax	6130do			
0300-0400	Canada, CKZN St John's	6160do			
0300-0400	Canada, CKZU Vancouver	6160do			
0300-0400	Canada, R Canada Intl	6010am	9755am		
0300-0400	China, China Radio Intl	9690am	9710am	11695am	
0300-0400 vl	Costa Rica,Faro del Carib	5055do			
0300-0400	Costa Rica,RF Peace Intl	6205am	7385am		
0300-0400	Cuba, Radio Havana	6000na	9820na	9830na	
0300-0327	Czech Rep, Radio Prague	5930na	7345na		
0300-0400	Ecuador, HCJB	9745am	21455am		
0300-0330	Egypt, Radio Cairo	9475na			
0300-0350	Germany, Deutsche Welle	6045na	6085na	9535na	9650na
0300-0400	Guatemala, Radio Cultural	3300do			
0300-0400	Japan, R Japan/NHK World	5960na	11790na	11840as	11960as
		15230na	17810as		
0300-0400 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0300-0400	Lebanon, Voice of Hope	9960va			
0300-0400 s/vl	Malta, VO Mediterranean	15550as	17570au		
0300-0325	Netherlands, Radio	9860as	11655as		
0300-0400	New Zealand, R NZ Intl	15115pa			
0300-0400 vl	Papua New Guinea, NBC	9675do			
0300-0400	Russia,Voice of Russia WS	5930na	5940na	6150na	7105na
		7175na	7345na	9580na	
0300-0400 mtwhfa	Russia,Voice of Russia WS	5920na			
0300-0355	S Africa, Channel Africa	3220af	5955af		
0300-0325	S Africa, Investment Ch	7175va	9775va		
0300-0400	Sri Lanka, Sri Lanka BC	9730as			
0300-0400	Taiwan, VO Free China	5950na	9680na	11745as	11825as
		15345as			
0300-0330	Thailand, Radio	9655na	11890na	11905na	
0300-0315 mtwhf	Uganda, Radio	3340do			
0300-0400	Ukraine, R Ukraine Intl	5915na	7150na	7180na	
0300-0330	United Kingdom, BBC WS	6135af	7235am	15360as	
0300-0400	United Kingdom, BBC WS	3255af	3955eu	5975am	6005af
		6175am	6190af	6195eu	9410va
		9515am	9590am	9600af	9605as
		11730af	11760va	12095af	15310as
0300-0400	USA, KAIJ Dallas TX	5810am			
0300-0400	USA, KTBN Salt Lk City UT	7510am			
0300-0400	USA, KVOH Los Angeles CA	9975am			
0300-0400	USA, KWHR Naalehu HI	17510au			
0300-0400	USA, Monitor Radio Intl	5850na	7535af		
0300-0400	USA, Voice of America	6035af	6080af	7105af	7290af
		7340af	7415af	9575af	9885af
0300-0330 smtwh	USA, Voice of America	4960af			
0300-0400	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0300-0400	USA, WGTG McCaysville GA	5085am			
0300-0400	USA, WHRI Noblesville IN	5760am			
0300-0400	USA, WJCR Upton KY	7490na			
0300-0400	USA, WWCR Nashville TN	2390am	3215am	5070am	5935am
0300-0400	USA, WYFR Okeechobee FL	6065na	9505na		
0300-0345	USA, WYFR Okeechobee FL	9355eu			
0300-0310	Vatican State, Vatican R	6095na	7305na		
0300-0400 mtwhfa	Zambia, ZNBC Radio 2	6165do			
0300-0400 vl	Zimbabwe, Zimbabwe BC	3396do			
0310-0340	Vatican State, Vatican R	7360af			
0315-0330 s	Greece, Voice of	6125na	7448na	9420na	
0330-0357	Czech Rep, Radio Prague	7350as			
0330-0400	Hungary, Radio Budapest	6195na	9840na		
0330-0400 vl	Philippines, R Pilipinas	13770as	15330na	17730as	
0330-0355	S Africa, Investment Ch	9775va	11985va		
0330-0400	Slovakia, Adv World Radio	9465af			
0330-0400	Sweden, Radio	7115na			
0330-0400	UAE, Radio Dubai	13665na	15400eu	21485na	
0330-0400	United Kingdom, BBC WS	9610af	11955as	15280as	
0335-0355 vl	India, All India Radio	7110do	11830do	15135do	
0340-0350	Greece, Voice of	6125na	7448na	9420na	
0345-0400 irreg	Burundi, Radio Nationale	6140do			
0345-0400 as	Uganda, Radio	3340do			
0356-0400	Zambia, Christian Voice	3330af			

Selected Programs

Sundays

0300 Australia, Radio: World News. See S 0000.
0300 KWHR (Hawaii): Turn Your Radio On. Bill Brasier plays southern gospel music.
0300 WHRI (Angel 1): 20 The Countdown Magazine. The top twenty contemporary Christian music hits in the country.
0300 WHRI (Angel 2): World of Prophecy. Texe Marrs and a guest discuss the evils and pitfalls of today and the outlook for tomorrow.
0310 Australia, Radio: Book Reading. Serialized readings of the best Australian novels.
0330 Australia, Radio: At Your Request. Dick Paterson plays favorite music.

Mondays

0300 Australia, Radio: World and Australian News. See S 1100.
0300 KWHR (Hawaii): The Sword of the Spirit. Mike Keyes evangelizes from Tucson, Arizona.
0300 WHRI (Angel 1): UPI News. See S 0400.
0300 WHRI (Angel 2): USA Radio News. See M 0200.
0305 WHRI (Angel 1): Music. See S 0000.
0306 WHRI (Angel 2): Radio Free America (live). See M 0206.
0310 Australia, Radio: Dateline Early Edition. See M 0010.
0322 Australia, Radio: Sports Bulletin. See S 1120.
0330 Australia, Radio: News Headlines. See S 2330.
0330 KWHR (Hawaii): DXing with Cumbre. See S 0430.
0331 Australia, Radio: Pacific Beat. A magazine which provides a focus on the people and issues of the region.

Tuesdays

0300 Australia, Radio: World and Australian News. See S 1100.
0300 KWHR (Hawaii): UPI News. See S 0400.
0300 WHRI (Angel 1&2): UPI News. See S 0400.
0305 KWHR (Hawaii): Music. See S 0000.
0305 WHRI (Angel 1): Music. See S 0000.
0306 WHRI (Angel 2): The Bay Buchanan Show (repeat). The sister of the Republican presidential candidate talks politics and other subjects.
0310 Australia, Radio: Dateline Early Edition. See M 0010.
0322 Australia, Radio: Sports Bulletin. See S 1120.
0330 Australia, Radio: News Headlines. See S 2330.
0331 Australia, Radio: Pacific Beat. See M 0331.

Wednesdays

0300 Australia, Radio: World and Australian News. See S 1100.
0300 KWHR (Hawaii): UPI News. See S 0400.
0300 WHRI (Angel 1&2): UPI News. See S 0400.
0305 KWHR (Hawaii): Music. See S 0000.
0305 WHRI (Angel 1): Music. See S 0000.
0306 WHRI (Angel 2): The Bay Buchanan Show (repeat). See T 0306.
0310 Australia, Radio: Dateline Early Edition. See M 0010.
0322 Australia, Radio: Sports Bulletin. See S 1120.
0330 Australia, Radio: News Headlines. See S 2330.
0331 Australia, Radio: Pacific Beat. See M 0331.

Thursdays

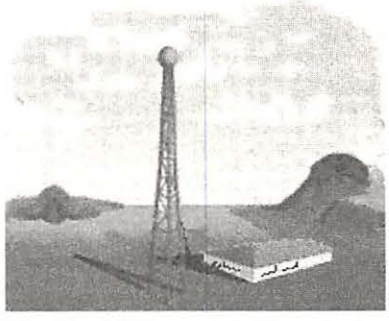
0300 Australia, Radio: World and Australian News. See S 1100.
0300 KWHR (Hawaii): UPI News. See S 0400.
0300 WHRI (Angel 1&2): UPI News. See S 0400.
0305 KWHR (Hawaii): Music. See S 0000.
0305 WHRI (Angel 1): Music. See S 0000.
0306 WHRI (Angel 2): The Bay Buchanan Show (repeat). See T 0306.
0310 Australia, Radio: Dateline Early Edition. See M 0010.
0322 Australia, Radio: Sports Bulletin. See S 1120.
0330 Australia, Radio: News Headlines. See S 2330.
0331 Australia, Radio: Pacific Beat. See M 0331.

Fridays

0300 Australia, Radio: World and Australian News. See S 1100.
0300 KWHR (Hawaii): UPI News. See S 0400.
0300 WHRI (Angel 1&2): UPI News. See S 0400.
0305 KWHR (Hawaii): Music. See S 0000.
0305 WHRI (Angel 1): Music. See S 0000.
0306 WHRI (Angel 2): The Bay Buchanan Show (repeat). See T 0306.
0310 Australia, Radio: Dateline Early Edition. See M 0010.
0322 Australia, Radio: Sports Bulletin. See S 1120.
0330 Australia, Radio: News Headlines. See S 2330.
0331 Australia, Radio: Pacific Beat. See M 0331.

Saturdays

0300 Australia, Radio: World News. See S 0000.
0300 KWHR (Hawaii): Turn Your Radio On. See S 0300.
0300 WHRI (Angel 1&2): UPI News. See S 0400.
0305 WHRI (Angel 1): Music. See S 0000.
0306 WHRI (Angel 2): The Bay Buchanan Show (repeat). See T 0306.
0310 Australia, Radio: Ockham's Razor. Robyn Williams with straight, sharp talk about science.
0330 Australia, Radio: The Australian Music Show. See M 0531.



The World Harvest Radio web site (www.whri.com) includes background and technical information.

Frequencies

0400-0500	Anguilla,Caribbean Beacon	6090am			
0400-0500	Australia, Radio	9660pa	11880pa	12080pa	13605as
		15240pa	15365pa	15415as	15510as
		17750as	17795pa	17880pa	
0400-0500 as	Australia, Radio	11640as			
0400-0500 vl	Australia, VL8K Katherine	5025do			
0400-0500 vl	Australia, VL8T Tent Crk	4910do			
0400-0500 vl	Canada, CBC N Quebec Svc	9625do			
0400-0500	Canada, CFCX Montreal	6005do			
0400-0500	Canada, CFRX Toronto	6070do			
0400-0500	Canada, CFVP Calgary	6030do			
0400-0500	Canada, CHNX Halifax	6130do			
0400-0500	Canada, CKZN St John's	6160do			
0400-0500	Canada, CKZU Vancouver	6160do			
0400-0430	Canada, R Canada Intl	6150me	9505me	9645me	
0400-0500	China, China Radio Intl	9560am	9730am		
0400-0500	Costa Rica,RF Peace Intl	6205am	7385am		
0400-0500	Cuba, Radio Havana	6000na	9820na	9830na	
0400-0500	Ecuador, HCJB	9745am	21455am		
0400-0450	Germany, Deutsche Welle	6015af	6065af	7225af	7265af
		9565af			
0400-0500 twhfa	Guatemala, Radio Cultural	3300do			
0400-0500 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0400-0500	Lebanon, Voice of Hope	9960va			
0400-0430 s/vl	Malta, VO Mediterranean	15550as	17570au		
0400-0430	Mexico, Radio Mexico Intl	9705na			
0400-0458	New Zealand, R NZ Intl	15115pa			
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as	
0400-0430 m	Norway, Radio Norway Intl	5965eu	7305me	7440na	
0400-0500 vl	Papua New Guinea, NBC	9675do			
0400-0430	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
0400-0500	Russia,Voice of Russia WS	5930na	6150na	7175na	7345na
		9580na			
0400-0500 mtwhfa	Russia,Voice of Russia WS	5920na			
0400-0455	S Africa, Channel Africa	5955af	9585af		
0400-0425	S Africa, Investment Ch	11985va	15225va		
0400-0430	Slovakia, Adv World Radio	11600af			
0400-0430	Sri Lanka, Sri Lanka BC	9730as			
0400-0430	Switzerland, Swiss R Intl	6135na	9885na	9905na	
0400-0430	Tanzania, Radio	5050af			
0400-0500	Turkey, Voice of	7100eu	9685na	17705eu	
0400-0415	Uganda, Radio	5026do			
0400-0500	Ukraine, R Ukraine Intl	5915na	7150na	9550na	
0400-0500	United Kingdom, BBC WS	3255af	3955eu	5975af	6005af
		6175am	6180eu	6190af	6195eu
		7160af	9410af	9590am	9600af
		9610af	11760va	11955as	12085af
		15280as	15310as	15575va	
0400-0430	United Kingdom, BBC WS	9605as	11730af		
0400-0500	USA, KAIJ Dallas TX	5810am			
0400-0500	USA, KTBN Salt Lk City UT	7510am			
0400-0500	USA, KVOH Los Angeles CA	9975am			
0400-0500	USA, KWHR Naalehu HI	17780as			
0400-0500	USA, Monitor Radio Intl	7535eu	9840af		
0400-0500	USA, Voice of America	4960af	6035af	6080af	7145af
		7340af	7415af	9575af	9775af
0400-0500	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0400-0500	USA, WGTG McCaysville GA	5085am			
0400-0500	USA, WHRI Noblesville IN	5760am			
0400-0500	USA, WJCR Upton KY	7490na			
0400-0500 smtwhf	USA, WMLK Bethel PA	9465eu			
0400-0500	USA, WRNO New Orleans LA	7355am			
0400-0500	USA, WWCR Nashville TN	2390am	3215am	5070am	5935am
0400-0500	USA, WYFR Okeechobee FL	9985af			
0400-0445	USA, WYFR Okeechobee FL	6065na	9505na		
0400-0430	Vietnam, Voice of	12020na	15010na		
0400-0500	Zambia, Christian Voice	3330af			
0400-0410	Zambia, ZNBC Radio 2	6165do			
0400-0500 vl	Zimbabwe, Zimbabwe BC	3396do			
0415-0500 m	USA, WRMI/R Miami Intl	9955am			
0425-0440	Italy, RAI Intl	5975eu	7275eu		
0425-0500	Nigeria, FRCN/Radio	3326do	4770do	4990do	
0430-0500	Australia,DefenseForces R	13525as			
0430-0455 mtwhf	Moldova, R Moldova Intl	7520eu			
0430-0500	Netherlands, Radio	5995na	6165na		
0430-0500 mtwhf	Portugal, R Portugal Intl	6150am	9570am		
0430-0455	S Africa, Investment Ch	11985va	15225va		
0430-0500	Swaziland, Trans World R	3200af	4775af	6070af	6100af
0430-0500	Switzerland, Swiss R Intl	9905na			
0430-0500	United Kingdom, BBC WS	15420af			
0430-0500	USA, Voice of America	7170va			
0455-0500	Malaysia, Voice of	6175as	9750as	15295au	
0459-0500	New Zealand, R NZ Intl	11905pa			

Selected Programs

Sundays

0400 Australia, Radio: World News. See S 0000.
0400 KWHR (Hawaii): Gospel Crusade Ministries. Scripture teachings by Roger Hedrick and free bible correspondence courses.
0400 WHRI (Angel 1): UPI News. Five minutes of news from the UPI Radio Network.
0400 WHRI (Angel 2): Biblical Studies Institute. Bob Tref evangelizes from Rapid City, South Dakota.
0405 WHRI (Angel 1): Music. See S 0000.
0410 Australia, Radio: Feedback. Roger Broadbent answers letters and discusses new programs, reception problems, and questions about Australia.
0430 Australia, Radio: The Media Report. Agnes Warren presents the inside story on how the media operates and puts the spotlight on media people and their activities.
0430 KWHR (Hawaii): Prophetic Voice Broadcast. See S 0000.
0430 WHRI (Angel 2): DXing with Cumbre. A what's-on-the-air program hosted by Marie Lamb.

Mondays

0400 Australia, Radio: World News. See S 0000.
0400 KWHR (Hawaii): Gospel Country. Les Roberts.
0400 WHRI (Angel 1): UPI News. See S 0400.
0405 WHRI (Angel 1): Music. See S 0000.
0406 WHRI (Angel 2): Radio Free America (live). See M 0206.
0410 Australia, Radio: Dateline. See M 0110.

Tuesdays

0400 Australia, Radio: World News. See S 0000.
0400 KWHR (Hawaii): Music. See S 0000.
0400 WHRI (Angel 1&2): UPI News. See S 0400.
0405 WHRI (Angel 1): Music. See S 0000.
0407 WHRI (Angel 2): The Bay Buchanan Show (repeat). See T 0306.
0410 Australia, Radio: Dateline. See M 0110.

Wednesdays

0400 Australia, Radio: World News. See S 0000.
0400 KWHR (Hawaii): Music. See S 0000.
0400 WHRI (Angel 1&2): UPI News. See S 0400.
0405 WHRI (Angel 1): Music. See S 0000.
0407 WHRI (Angel 2): The Bay Buchanan Show (repeat). See T 0306.
0410 Australia, Radio: Dateline. See M 0110.

Thursdays

0400 Australia, Radio: World News. See S 0000.
0400 KWHR (Hawaii): Music. See S 0000.
0400 WHRI (Angel 1&2): UPI News. See S 0400.
0405 WHRI (Angel 1): Music. See S 0000.
0407 WHRI (Angel 2): The Bay Buchanan Show (repeat). See T 0306.
0410 Australia, Radio: Dateline. See M 0110.
0454 Radio Netherlands: Documentary. Andorra: The Mini State (13th). See A 2354.
0454 Radio Netherlands: Documentary. From the Wireless to the World Wide Web: Part 2 (6th). See W 1254.
0454 Radio Netherlands: Documentary. The Eleventh Insight (20th). See F 1454.
0454 Radio Netherlands: Documentary. The Marshall Plan (27th). See F 2354.

Fridays

0400 Australia, Radio: World News. See S 0000.
0400 KWHR (Hawaii): Music. See S 0000.
0400 WHRI (Angel 1&2): UPI News. See S 0400.
0405 WHRI (Angel 1): Music. See S 0000.
0407 WHRI (Angel 2): The Bay Buchanan Show (repeat). See T 0306.
0410 Australia, Radio: Dateline. See M 0110.

Saturdays

0400 Australia, Radio: World News. See S 0000.
0400 KWHR (Hawaii): The Pat Boone Show. Pat Boone sings.
0400 WHRI (Angel 1&2): UPI News. See S 0400.
0405 WHRI (Angel 1): Music. See S 0000.
0407 WHRI (Angel 2): The Bay Buchanan Show (repeat). See T 0306.
0410 Australia, Radio: Book Reading. See S 0310.
0430 Australia, Radio: The Health Report. A program that examines health issues and makes complex scientific data understandable.

Radio Netherlands, "The European station with a Dutch accent"

Frequencies

0500-0600	Anguilla,Caribbean Beacon	6090am			
0500-0600	Australia, Radio	9660pa	11880pa	12080pa	13605as
		15240pa	15365pa	17715pa	17795pa
		17880pa			
0500-0600 as	Australia, Radio	11640as			
0500-0600 vl	Australia, VL8K Katherine	5025do			
0500-0600 vl	Australia, VL8T Tent Crk	4910do			
0500-0600	Australia,DefenseForces R	13525as			
0500-0600	Bulgaria, Radio	7375na	9485na		
0500-0600	Canada, CFCX Montreal	6005do			
0500-0600	Canada, CFRX Toronto	6070do			
0500-0600	Canada, CFVP Calgary	6030do			
0500-0600	Canada, CHNX Halifax	6130do			
0500-0600	Canada, CKZU Vancouver	6160do			
0500-0600	China, China Radio Intl	9650am			
0500-0600	Costa Rica, Adv World R	5030ca	6150ca	9725ca	
0500-0600	Costa Rica,RF Peace Intl	6205am	7385am		
0500-0600	Cuba, Radio Havana	6000na	9830na		
0500-0600	Ecuador, HCJB	9745am	21455am		
0500-0550	Germany, Deutsche Welle	6120na	6145na	6185na	9650na
0500-0515	Israel, Kol Israel	7465na	9435na	17545af	
0500-0600	Japan, R Japan/NHK World	6110na	6150eu	9835na	11740as
		11910am	11920na	17810as	
0500-0530	Japan, R Japan/NHK World	9635am	11895am	12000am	
0500-0600 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0500-0600	Lebanon, Voice of Hope	9960va			
0500-0600	Liberia,LCN/R Liberia Int	5100do			
0500-0510 mtwhf	Malawi, MBC	3380do			
0500-0600	Malaysia, Voice of	6175as	9750as	15295au	
0500-0530 m-a/vl	Mexico, Radio Mexico Intl	9705na			
0500-0525	Netherlands, Radio	5995na	6165na		
0500-0600	New Zealand, R NZ Intl	11905pa			
0500-0505	Nigeria, FRCN/Radio	3326do	4770do	4990do	
0500-0600 vl	Papua New Guinea, NBC	9675do			
0500-0600	Russia,Voice of Russia WS	5930na	6150na	7175na	
0500-0600 mtwhfa	Russia,Voice of Russia WS	5920na			
0500-0555	S Africa, Channel Africa	5955af	11900af		
0500-0525	S Africa, Investment Ch	11985va	15225va		
0500-0600	Slovakia, Adv World Radio	7215eu			
0500-0600	Spain, R Exterior Espana	6055am			
0500-0600	Swaziland, Trans World R	3200af	4775af	6070af	6100af
		9500af			
0500-0515	Uganda, Radio	3340do			
0500-0600	United Kingdom, BBC WS	3255af	3955va	5975am	6005af
		6175am	6180va	6190af	6195eu
		7150va	7160af	9410va	9600af
		9740as	11760va	11955as	12095va
		15310as	15360as	15420af	15575va
	17640af	17885af			
0500-0600	USA, KAIJ Dallas TX	5810am			
0500-0600	USA, KTBN Salt Lk City UT	7510am			
0500-0600	USA, KVOH Los Angeles CA	9975am			
0500-0600	USA, KWHR Naalehu HI	9930as			
0500-0600	USA, Monitor Radio Intl	7535eu			
0500-0600	USA, Voice of America	4960af	5970af	6035af	6080af
		7170va	7295af	9700va	9775af
		11825me	12080af	12085eu	15205me
0500-0600	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0500-0600	USA, WGTG McCaysville GA	5085am			
0500-0600	USA, WHRI Noblesville IN	5760am	7315am		
0500-0600	USA, WJCR Upton KY	7490na			
0500-0600 smtwhf	USA, WMLK Bethel PA	9465eu			
0500-0600	USA, WRNO New Orleans LA	7355am			
0500-0600	USA, WWCR Nashville TN	2390am	3215am	5070am	5935am
0500-0600	USA, WYFR Okeechobee FL	5985na	9985eu	11695af	
0500-0528	Vatican State, Vatican R	5882eu	9660af	11625af	
0500-0600	Zambia, Christian Voice	3330af			
0500-0510	Zambia, ZNBC Radio 1	7220do			
0500-0510	Zambia, ZNBC Radio 2	6165do			
0500-0530 vl	Zimbabwe, Zimbabwe BC	3396do			
0525-0600	Ghana, Ghana Broadc Corp	3366do	4915do		
0530-0559	Austria, R Austria Intl	6015na	6155eu	13730eu	15410me
		17870me			
0530-0600	Romania, R Romania Intl	11940af	15250af	15365af	17745af
		17790af			
0530-0600	Russia,Voice of Russia WS	5905na	7330na		
0530-0555	S Africa, Investment Ch	11985va			
0530-0600	Slovakia, Adv World Radio	11600eu			
0530-0600	Thailand, Radio	9655eu	11905eu	15115eu	
0530-0600 vl	Zimbabwe, Zimbabwe BC	5975do			

Selected Programs

Sundays

0500 Australia, Radio: World News. See S 0000.
0500 KWHR (Hawaii): Breakthrough. Rod Parsley conducts services from the World Harvest Church in Columbus, OH.
0500 WHRI (Angel 1): Turn Your Radio On. See S 0300.
0500 WHRI (Angel 2): Music. See S 0000.
0510 Australia, Radio: Pacific Focus #4. Coverage of religious issues of relevance to people of the Pacific region.
0530 Australia, Radio: Fine Music Australia. The best Australian fine music performances and compositions are presented by Ivan Lloyd.

Mondays

0500 Australia, Radio: World and Australian News and Sport. Five minutes of world news followed by five minutes of Australian news plus a sports wrap-up.
0500 KWHR (Hawaii): Music. See S 0000.
0500 WHRI (Angel 2): The Hour of Courage. Ron Wilson talks politics and the precious metals market.
0510 Australia, Radio: Pacific Focus. See S 0510.
0525 Australia, Radio: On This Day. Anniversaries worth remembering.
0530 Australia, Radio: News Headlines. See S 2330.
0530 WHRI (Angel 2): The Prophecy Club. See S 0000.
0531 Australia, Radio: The Australian Music Show. Kim Taylor presents the music, people, and issues of the Australian contemporary music industry.

Tuesdays

0500 Australia, Radio: World and Australian News and Sport. See M 0500.
0500 KWHR (Hawaii): Music. See S 0000.
0500 WHRI (Angel 1): Bob Enyart (live). Bob takes listener phone calls about everyday Christian topics.
0500 WHRI (Angel 2): The Prophecy Club. See S 0000.
0510 Australia, Radio: Pacific Focus. See S 0510.
0525 Australia, Radio: On This Day. See M 0525.
0530 Australia, Radio: News Headlines. See S 2330.
0530 WHRI (Angel 2): The Hour of Courage. See M 0500.
0531 Australia, Radio: Jazz Notes. The best of Australian jazz is introduced by Ivan Lloyd.

Wednesdays

0500 Australia, Radio: World and Australian News and Sport. See M 0500.
0500 KWHR (Hawaii): Music. See S 0000.
0500 WHRI (Angel 1): Bob Enyart (live). See T 0500.
0500 WHRI (Angel 2): The Prophecy Club. See S 0000.
0510 Australia, Radio: Pacific Focus. See S 0510.
0525 Australia, Radio: On This Day. See M 0525.
0530 Australia, Radio: News Headlines. See S 2330.
0530 WHRI (Angel 2): The Hour of Courage. See M 0500.
0531 Australia, Radio: Blacktracker. Mal Honess with an insight into the music and performance of Australia's aborigines.

Thursdays

0500 Australia, Radio: World and Australian News and Sport. See M 0500.
0500 KWHR (Hawaii): Music. See S 0000.
0500 WHRI (Angel 1): Bob Enyart (live). See T 0500.
0500 WHRI (Angel 2): The Prophecy Club. See S 0000.
0510 Australia, Radio: Pacific Focus. See S 0510.
0525 Australia, Radio: On This Day. See M 0525.
0530 Australia, Radio: News Headlines. See S 2330.
0530 WHRI (Angel 2): The Hour of Courage. See M 0500.
0531 Australia, Radio: Australian Country Style. Graham Bell goes up country.

Fridays

0500 Australia, Radio: World and Australian News and Sport. See M 0500.
0500 KWHR (Hawaii): Music. See S 0000.
0500 WHRI (Angel 1): Bob Enyart (live). See T 0500.
0500 WHRI (Angel 2): The Prophecy Club. See S 0000.
0510 Australia, Radio: Pacific Focus. See S 0510.
0525 Australia, Radio: On This Day. See M 0525.
0530 Australia, Radio: News Headlines. See S 2330.
0530 WHRI (Angel 2): The Hour of Courage. See M 0500.
0531 Australia, Radio: Music Deli. Paul Petran present music from a variety of cultures.

Saturdays

0500 Australia, Radio: World News. See S 0000.
0500 KWHR (Hawaii): DXing with Cumbre. See S 0430.
0500 WHRI (Angel 1&2): Bob Enyart (live). See T 0500.
0510 Australia, Radio: Oz Sounds #1. See S 1510.
0530 Australia, Radio: Social History Feature. No Information available.
0530 KWHR (Hawaii): World Harvest Country Style. Joe Brashier plays country music with a Christian slant.

Frequencies

0600-0700	Anguilla,Caribbean Beacon	6090am			
0600-0700	Australia, Radio	9660pa	9860pa	11880pa	12080pa
		13605as	15240pa	15365pa	15415as
		15530as	17715as	17880pa	
0600-0700 vl	Australia, VL8K Katherine	5025do			
0600-0700 vl	Australia, VL8T Tent Crk	4910do			
0600-0633	Australia,DefenseForces R	13525as			
0600-0700 vl	Canada, CBC N Quebec Svc	9625do			
0600-0700	Canada, CFCX Montreal	6005do			
0600-0700	Canada, CFRX Toronto	6070do			
0600-0700	Canada, CFVP Calgary	6030do			
0600-0700	Canada, CHNX Halifax	6130do			
0600-0700	Canada, CKZU Vancouver	6160do			
0600-0630 mtwhf	Canada, R Canada Intl	6050eu	6150eu	9740af	9760af
		11905me			
0600-0700	Costa Rica,RF Peace Intl	6205am	7385am		
0600-0700	Cuba, Radio Havana	6000na	9830na		
0600-0700	Ecuador, HCJB	9745am	21455am		
0600-0650	Germany, Deutsche Welle	7225af	9565af	11765af	13790af
		17820as	21705me		
0600-0615	Ghana, Ghana Broadc Corp	3366do	4915do		
0600-0700 vl	Italy, IRRS	3985va			
0600-0700	Japan, R Japan/NHK World	11850as	11910as	17810au	
0600-0700 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0600-0700 vl	Kiribati, Radio	9825do			
0600-0700	Lebanon, Voice of Hope	9960va			
0600-0700	Liberia,LCN/R Liberia Int	5100do			
0600-0700	Malaysia, Voice of	6175as	9750as	15295au	
0600-0700	New Zealand, R NZ Intl	11905pa			
0600-0630	Nigeria, FRCN/Radio	3326do	4770do	4990do	
0600-0650	North Korea, R Pyongyang	15180as	15230as		
0600-0630 s	Norway, Radio Norway Intl	5965eu	7180af	9590me	15235af
0600-0700 vl	Papua New Guinea, NBC	9675do			
0600-0700	Russia,Voice of Russia WS	5905na	5920na	5930na	6150na
		7175na	7330na	12025pa	12035as
		15460as	15470au	17570pa	21790au
0600-0625	S Africa, Investment Ch	9675af	11985af	15225af	
0600-0655	S Africa, Trans World R	11730af			
0600-0610	Sierra Leone, SLBS	3316do			
0600-0630	Slovakia, Adv World Radio	13715af			
0600-0700	Slovakia, Adv World Radio	5905am			
0600-0630 vl	Solomon Islands, SIBC	5020do	9545do		
0600-0700	Swaziland, Trans World R	3200af	4775af	6070af	6100af
		9500af	9650af		
0600-0630	Switzerland, Swiss R Intl	9885af	11860af	13635af	
0600-0700	United Kingdom, BBC WS	3955eu	5975am	6005af	6175eu
		6180va	6190af	6195eu	7145as
		7160af	7325va	9410eu	9600af
		9740as	11940af	11955as	15310as
		15360as	15420af	17640af	17790as
		17885af	21660as		
0600-0700	USA, KAIJ Dallas TX	5810am			
0600-0700	USA, KTBN Salt Lk City UT	7510am			
0600-0700	USA, KVOH Los Angeles CA	9975am			
0600-0700	USA, KWHR Naalehu HI	9930as			
0600-0700	USA, Monitor Radio Intl	7535eu			
0600-0700	USA, Voice of America	5970eu	5995va	6035eu	6080eu
		7170va	7285af	9760me	11805va
		11825me	11950eu	15205me	15600eu
0600-0630	USA, Voice of America	4960af			
0600-0700	USA, WGTG McCaysville GA	5085am			
0600-0700	USA, WHRI Noblesville IN	5760am	7315am		
0600-0700	USA, WJCR Upton KY	7490na			
0600-0700 smtwhf	USA, WMLK Bethel PA	9465eu			
0600-0700	USA, WRNO New Orleans LA	7355am			
0600-0700	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0600-0700	USA, WYFR Okeechobee FL	5985af	7355eu	9985af	
0600-0620	Vatican State, Vatican R	5880eu	7250eu		
0600-0645 vl/m-f	Vatican State, vatican R	15215me			
0600-0630	Vietnam, Voice of	5925as	10060as		
0600-0700	Yemen, Yemeni Rep Radio	9780do			
0600-0700	Zambia, Christian Voice	3330af			
0600-0605 mtwhfa	Zambia, ZNBC Radio 1	7220do			
0600-0630	Zambia, ZNBC Radio 2	6165do			
0600-0700 vl	Zimbabwe, Zimbabwe BC	5975do			
0615-0630	Switzerland, Swiss R Intl	5840eu	6165eu		
0630-0655	Austria, R Austria Intl	6015na			
0630-0655	S Africa, Investment Ch	9675af	15225af	17735af	
0630-0700	United Kingdom, BBC WS	11780va	15565va		
0630-0700	Vatican State, Vatican R	11625af	13765af	15570af	
0631-0640	Romania, R Romania Intl	7105eu	9625eu	9665eu	11775eu
0645-0700	Romania, R Romania Intl	15370pa	17720pa	17790as	17805as

Selected Programs

Sundays

0600 Australia, Radio: World News. See S 0000.
0600 KWHR (Hawaii): Music. See S 0000.
0600 WHRI (Angel 1&2): The Joy of Living Broadcast. Ms. Hurst and Ms. Smith evangelize with words and song.
0610 Australia, Radio: Feedback. See S 0410.
0615 WHRI (Angel 1): Music. See S 0000.
0630 Australia, Radio: Correspondents' Report. See S 0030.
0630 KWHR (Hawaii): Eternal Good News. Germaine Lockwood teaches from the Old Testament.
0630 WHRI (Angel 1&2): The Mercies of God Radio Broadcast. Pastor Peter from Michigan preaches mercy for lost sinners.

Mondays

0600 Australia, Radio: World News. See S 0000.
0600 KWHR (Hawaii): World Harvest. Steve Sumrall with a full hour of music and a ministry update.
0600 WHRI (Angel 1&2): John Hagee Today. Evangelizing by John Hagee of the Cornerstone Church in San Antonio, TX.
0610 Australia, Radio: Dateline Early Edition. See M 0010.
0622 Australia, Radio: Sports Bulletin. See S 1120.
0630 Australia, Radio: News Headlines. See S 2330.
0630 WHRI (Angel 1&2): In Touch. See S 1300.
0631 Australia, Radio: Pacific Beat (repeat). See M 0331.
0655 WHRI (Angel 1&2): Alive Today. See S 1300.

Tuesdays

0600 Australia, Radio: World News. See S 0000.
0600 KWHR (Hawaii): World Harvest. See M 0600.
0600 WHRI (Angel 1&2): John Hagee Today. See M 0600.
0610 Australia, Radio: Dateline Early Edition. See M 0010.
0622 Australia, Radio: Sports Bulletin. See S 1120.
0630 Australia, Radio: News Headlines. See S 2330.
0630 WHRI (Angel 1&2): In Touch. See S 1300.
0631 Australia, Radio: Pacific Beat (repeat). See M 0331.
0655 WHRI (Angel 1&2): Alive Today. See S 1300.

Wednesdays

0600 Australia, Radio: World News. See S 0000.
0600 KWHR (Hawaii): World Harvest. See M 0600.
0600 WHRI (Angel 1&2): John Hagee Today. See M 0600.
0610 Australia, Radio: Dateline Early Edition. See M 0010.
0622 Australia, Radio: Sports Bulletin. See S 1120.
0630 Australia, Radio: News Headlines. See S 2330.
0630 WHRI (Angel 1&2): In Touch. See S 1300.
0631 Australia, Radio: Pacific Beat (repeat). See M 0331.
0655 WHRI (Angel 1&2): Alive Today. See S 1300.

Thursdays

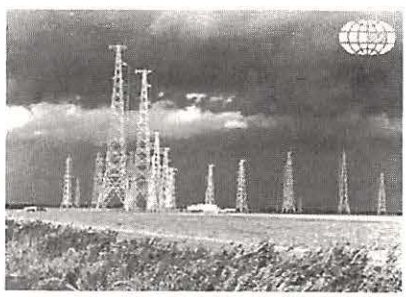
0600 Australia, Radio: World News. See S 0000.
0600 KWHR (Hawaii): World Harvest. See M 0600.
0600 WHRI (Angel 1&2): John Hagee Today. See M 0600.
0610 Australia, Radio: Dateline Early Edition. See M 0010.
0622 Australia, Radio: Sports Bulletin. See S 1120.
0630 Australia, Radio: News Headlines. See S 2330.
0630 WHRI (Angel 1&2): In Touch. See S 1300.
0631 Australia, Radio: Pacific Beat (repeat). See M 0331.
0655 WHRI (Angel 1&2): Alive Today. See S 1300.

Fridays

0600 Australia, Radio: World News. See S 0000.
0600 KWHR (Hawaii): World Harvest. See M 0600.
0600 WHRI (Angel 1&2): John Hagee Today. See M 0600.
0610 Australia, Radio: Dateline Early Edition. See M 0010.
0622 Australia, Radio: Sports Bulletin. See S 1120.
0630 Australia, Radio: News Headlines. See S 2330.
0630 WHRI (Angel 1&2): In Touch. See S 1300.
0631 Australia, Radio: Pacific Beat (repeat). See M 0331.
0655 WHRI (Angel 1&2): Alive Today. See S 1300.

Saturdays

0600 Australia, Radio: World News. See S 0000.
0600 KWHR (Hawaii): Music. See S 0000.
0600 WHRI (Angel 1&2): DXing with Cumbre. See S 0430.
0610 Australia, Radio: Book Reading. See S 0310.
0630 Australia, Radio: Indian Pacific. See A 0030.
0630 KWHR (Hawaii): Truth for the World. See S 1430.
0630 WHRI (Angel 1&2): Music. See S 0000.



A reception report to Radio Netherlands may bring you this QSL—a dramatic black and white photograph of the Flevo transmitter site on a stormy day.

FREQUENCIES

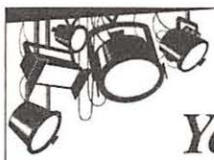
0700-0800	Australia, Radio	6020pa	9580pa	9660pa	9710as
		9860pa	12080pa	15240pa	15365pa
		15415as	15530as	17715pa	17880as
0700-0800 as	Australia, Radio	11640as			
0700-0800 vl	Australia, VL8K Katherine	5025do			
0700-0800 vl	Australia, VL8T Tent Crk	4910do			
0700-0800	Canada, CFCX Montreal	6005do			
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica,RF Peace Intl	6205am	7385am		
0700-0800	Ecuador, HCJB	5860eu	9445pa	21455au	
0700-0800 as	Eqt Guinea, R East Africa	15186af			
0700-0800 mtwhf	Eqt Guinea, Radio Africa	15186af			
0700-0715	Ghana, Ghana Broadc Corp	3366do	4915do		
0700-0800 vl	Italy, IRRS	3985va			
0700-0800	Japan, R Japan/NHK World	7230eu	11740as	11850pa	11910as
		11920as	15165me	15590me	17810va
		17815af			
0700-0800 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0700-0800 vl	Kiribati, Radio	9825do			
0700-0800	Lebanon, Voice of Hope	9960va			
0700-0715	Liberia,LCN/R Liberia Int	5100do			
0700-0800 asmtwh	Malaysia, Radio	7295do			
0700-0800	Malaysia, Voice of	6175as	9750as	15295au	
0700-0715 mtwhf	New Zealand, R NZ Intl	11905pa			
0700-0758 as	New Zealand, R NZ Intl	11905pa			
0700-0750	North Korea, R Pyongyang	15340af	17765me		
0700-0800 vl	Papua New Guinea, NBC	4890do			
0700-0745	Romania, R Romania Intl	15370pa	17720pa	17790pa	17805pa
0700-0715 s	Romania, R Romania Intl	15370pa	17720pa	17790pa	17805pa
0700-0800	Russia,Voice of Russia WS	5905as	5930na	6150na	7175na
		7330na	12025au	12035as	15460as
		15470pa	17570pa	21790au	
0700-0800 mtwhfa	Russia,Voice of Russia WS	5920na			
0700-0725	S Africa, Investment Ch	9675af	15225af	17735af	
0700-0710	Sierra Leone, SLBS	3316do			
0700-0800 vl	Solomon Islands, SIBC	5020do	9545do		
0700-0800	Swaziland, Trans World R	4775af	6100af	9500af	9650af
0700-0800	Taiwan, VO Free China	5950na			
0700-0800	United Kingdom, BBC WS	3955eu	5975am	6175eu	6180va
		6190af	6195eu	7145as	7325eu
		9410eu	9600af	9740as	11760as
		11780va	11940af	11955as	12095va
		15310as	15360as	15400af	15485va
		15565va	15575me	17640af	17790as
		17830af	21660as		
0700-0800 as	United Kingdom, BBC WS	17885af			
0700-0715	United Kingdom, BBC WS	6005af	7160af		
0700-0800	USA, KAIJ Dallas TX	5810am			
0700-0800	USA, KTBN Salt Lk City UT	7510am			
0700-0800	USA, KVOH Los Angeles CA	9975am			
0700-0800	USA, KWHR Naalehu HI	9930au			
0700-0800	USA, Monitor Radio Intl	7535eu			
0700-0800	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0700-0800	USA, WHRI Noblesville IN	5760am	7315am		
0700-0800	USA, WJCR Upton KY	7490na			
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0700-0745	USA, WYFR Okeechobee FL	7355eu	9985eu		
0700-0800	USA, WYFR Okeechobee FL	9455af			
0700-0800 vl	Vanuatu, Radio	3945do	7260do		
0700-0745 vl/m-f	Vatican State, Vatican R	4005eu	5880eu	7250eu	9645eu
0700-0800	Zambia, Christian Voice	6065af			
0700-0800	Zambia, ZNBC Radio 2	6165do			
0700-0800 vl	Zimbabwe, Zimbabwe BC	5975do			
0703-0710 mtwhf	Croatia, Croatian Radio	5895eu	5920eu	7165eu	9830eu
		11635eu	11830eu	13830eu	
0715-0730	Switzerland, Swiss R Intl	5840eu	6165eu		
0720-0800 vl	Chile, R Esperanza	6089am			
0730-0800	Belgium, R Vlaanderen Int	5985eu	9925eu	9940au	
0730-0745 s	Greece, Voice of	7448eu	9425eu	15175au	
0730-0735	India, All India Radio	15185do	15260do		
0730-0800	Netherlands, Radio	9830au	11895pa		
0730-0800 as	Palau, KHBN/Voice of Hope	9730as			
0730-0755	S Africa, Investment Ch	15225af	17735af		
0740-0800	Guam, TWR/KTWR	15200as			
0745-0800 s	Ghana, Ghana Broadc Corp	3366do	4915do		
0745-0755	Greece, Voice of	7448eu	9425eu	15175au	
0745-0755 as	Monaco, Trans World Radio	7115eu			
0755-0800 mtwhf	Monaco, Trans World Radio	7115eu			
0759-0800 as	New Zealand, R NZ Intl	9700pa			

0800-0900	Australia, Radio	5995pa	6020pa	6080pa	9510as
		9580pa	9710pa	9860pa	12080pa
		13605pa	15530as	17715pa	21725as
0800-0830 vl	Australia, VL8K Katherine	5025do			
0800-0830 vl	Australia, VL8T Tent Crk	4910do			
0800-0900 vl	Canada, CBC N Quebec Svc	9625do			
0800-0900	Canada, CFCX Montreal	6005do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0835 vl	Chile, R Esperanza	6089am			
0800-0900	Costa Rica,RF Peace Intl	6205am	7385am		
0800-0827	Czech Rep, Radio Prague	7345eu	9505eu		
0800-0900	Ecuador, HCJB	5860eu	9445pa	21455au	
0800-0900 as	Eqt Guinea, R East Africa	15186af			
0800-0900 mtwhf	Eqt Guinea, Radio Africa	15186af			
0800-0830	Georgia, Radio	11910eu			
0800-0805 s	Ghana, Ghana Broadc Corp	3366do			
0800-0900	Guam, TWR/KTWR	15200as			
0800-0900	Indonesia, Voice of	9525as			
0800-0830 vl	Italy, IRRS	3985va			
0800-0900 vl	Kiribati, Radio	9825do			
0800-0900	Lebanon, Voice of Hope	9960va			
0800-0900	Liberia,LCN/R Liberia Int	5100do			
0800-0900	Malaysia, Radio	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295au	
0800-0900	Monaco, Trans World Radio	7115eu			
0800-0825	Netherlands, Radio	9830au	11895pa		
0800-0900	New Zealand, R NZ Intl	9700pa			
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0850	Pakistan, Radio	15470eu	17900eu		
0800-0900 as	Palau, KHBN/Voice of Hope	9730as			
0800-0900 vl	Papua New Guinea, NBC	4890do			
0800-0900	Russia,Voice of Russia WS	7220as	9875pa	12025au	12035as
		15460as			
0800-0825	S Africa, Investment Ch	17735me	21745me		
0800-0810	Sierra Leone, SLBS	3316do			
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, R Korea Intl	9570au	13670eu		
0800-0820	Swaziland, Trans World R	4775af	6100af	9500af	9650af
0800-0900	United Kingdom, BBC WS	6190af	6195va	7325va	9410eu
		9740as	11750as	11760as	11940af
		11955as	12095va	15310as	15485va
		15575me	17640af	17830af	21660as
0800-0900 as	United Kingdom, BBC WS	15565va			
0800-0900	USA, KAIJ Dallas TX	5810am			
0800-0900	USA, KNLS Anchor Point AK	6150as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, KWHR Naalehu HI	9930as			
0800-0900	USA, Monitor Radio Intl	7535eu	11550pa	15665eu	
0800-0900	USA, WEWN Birmingham AL	5825eu	7425na		
0800-0900	USA, WHRI Noblesville IN	5760am	7315am		
0800-0900	USA, WJCR Upton KY	7490na			
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0800-0900	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0800-0830 vl	Vanuatu, Radio	3945do	7260do		
0800-0900	Zambia, Christian Voice	6065af			
0800-0805 mtwhfa	Zambia, ZNBC Radio 2	6165do			
0800-0900 vl	Zimbabwe, Zimbabwe BC	5975do			
0803-0810 as	Croatia, Croatian Radio	5895eu	5920eu	7165eu	9830eu
		11635eu	11830eu	13830eu	
0815-0900 mtwtf	Nigeria, FRCN/Radio	3326do	4770do	4990do	
0816-0900 mtwhf	New Zealand, R NZ Intl	9700pa			
0830-0900 vl	Australia, VL8A Alice Spg	2310do			
0830-0900 vl	Australia, VL8K Katherine	2485do			
0830-0900 vl	Australia, VL8T Tent Crk	2325do			
0830-0855	Austria, R Austria Intl	6155eu	13730eu	15240as	17870au
0830-0840	India, All India Radio	7250do	15185do	15260do	
0830-0900 vl	Italy, IRRS	7125va			
0830-0900	Netherlands, Radio	5965pa	9830au	13700pa	
0830-0855	S Africa, Investment Ch	17735me	21745me		
0830-0900	Slovakia, R Slovakia Intl	11990au	17550au	21705au	
0850-0853 s	Russia, R Pacific Ocean	7185as			
0855-0900	Guam, TWR/KTWR	11830au			

FREQUENCIES

0900-1000	Australia, Radio	5995pa	6020pa	6080pa	9510as
		9580pa	9710pa	9860pa	12080pa
		13605as	21725as		
0900-1000 vl	Australia, VL8A Alice Spg	2310do			
0900-1000 vl	Australia, VL8K Katherine	2485do			
0900-1000 vl	Australia, VL8T Tent Crk	2325do			
0900-1000	Canada, CFCX Montreal	6005do			
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-1000	China, China Radio Intl	11755pa	15440pa		
0900-1000	Costa Rica,RF Peace Intl	6205am	7385am		
0900-1000	Ecuador, HCJB	9445pa	21455au		
0900-1000 as	Eqt Guinea, R East Africa	15186af			
0900-1000 mtwhf	Eqt Guinea, Radio Africa	15186af			
0900-0950	Germany, Deutsche Welle	6160pa	7380as	9565af	11715as
		15145af	15410af	17800af	17820pa
		21600af			
0900-0915 mtwtf	Ghana, Ghana Broadc Corp	3366do	4915do		
0900-0915	Guam, TWR/KTWR	15200as			
0900-1000 m-f/vl	Italy, IRRS	7125va			
0900-1000	Japan, R Japan/NHK World	7125as	11815as	11850au	
0900-0930 vl	Kiribati, Radio	9825do			
0900-1000	Lebanon, Voice of Hope	9960va			
0900-0915	Liberia,LCN/R Liberia Int	5100do			
0900-1000	Malaysia, Radio	7295do			
0900-0920 mtwhf	Monaco, Trans World Radio	7115eu			
0900-0905 a	Monaco, Trans World Radio	7115eu			
0900-0925	Netherlands, Radio	5965pa	9830au	13700pa	
0900-1000	New Zealand, R NZ Intl	9700pa			
0900-0930 s	Norway, Radio Norway Intl	13800au	15220me		
0900-1000 as	Palau, KHBN/Voice of Hope	9730as			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Russia,Voice of Russia WS	7220as	9675pa	9835au	9875au
		17860au			
0900-0925	S Africa, Investment Ch	17735va	21745va		
0900-0930	Switzerland, Swiss R Intl	9885pa	12075au	13685pa	
0900-1000	United Kingdom, BBC WS	6190af	6195as	9410eu	11750as
		11940af	12095eu	15190sa	15280as
		15360as	15400af	15485va	15565va
		15575me	17640af	17705eu	17830af
		17885af			
0900-0915	United Kingdom, BBC WS	6065as	7325va	9580as	11760as
		11955as	15310as		
0900-1000	USA, KAIJ Dallas TX	5810am			
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, Monitor Radio Intl	7395sa	7535eu	9430as	13840au
0900-1000	USA, WEWN Birmingham AL	5825eu	7425na		
0900-1000	USA, WHRI Noblesville IN	5760am	7315am	9930am	
0900-1000	USA, WJCR Upton KY	7490na			
0900-1000 as	USA, WVHA Greenbush ME	13825af			
0900-1000	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0900-1000	Zambia, Christian Voice	6065af			
0900-1000 vl	Zimbabwe, Zimbabwe BC	5975do			
0903-0910 mtwhf	Croatia, Croatian Radio	5895eu	5920eu	7165eu	9830eu
		11635eu	11830eu	13830eu	
0915-1000	Bhutan, Bhutan BC Service	6035do			
0915-1000	Ghana, Ghana Broadc Corp	6130do	7295do		
0930-1000 s	Armenia, Voice of	15270eu			
0930-1000	Canada, CKZN St John's	6160do			
0930-1000	Georgia, Radio	11910me			
0930-1000	Netherlands, Radio	5965as	7260as	9810as	9830au
0930-1000	Philippines, FEBC/R Intl	11635as			
0930-0955	S Africa, Investment Ch	11985af	17735va	21745va	

1000-1100	Australia, Radio	5995as	6020pa	6080pa	9510as
		9580pa	9860pa	13605as	21725as
1000-1100 vl	Australia, VL8A Alice Spg	2310do			
1000-1100 vl	Australia, VL8K Katherine	2485do			
1000-1100 vl	Australia, VL8T Tent Crk	2325do			
1000-1025 mtwhfa	Belgium, R Vlaanderen Int	6035eu			
1000-1100 vl	Canada, CBC N Quebec Svc	9625do			
1000-1100	Canada, CFCX Montreal	6005do			
1000-1100	Canada, CFRX Toronto	6070do			
1000-1100	Canada, CFVP Calgary	6030do			
1000-1100	Canada, CHNX Halifax	6130do			
1000-1100	Canada, CKZN St John's	6160do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	11755pa	15440pa		
1000-1100	Costa Rica,RF Peace Intl	6205am	7385am		
1000-1030	Czech Rep, Radio Prague	17485af	21705me		
1000-1100	Ecuador, HCJB	9445pa	21455au		
1000-1100 as	Eqt Guinea, R East Africa	15186af			
1000-1100 mtwhf	Eqt Guinea, Radio Africa	15186af			
1000-1100	Guam, TWR/KTWR	9870as			
1000-1100	India, All India Radio	11585as	13700as	15050as	17387au
		17840as			
1000-1100 vl	Italy, IRRS	7125va			
1000-1100	Lebanon, Voice of Hope	9960va			
1000-1100	Malaysia, Radio	7295do			
1000-1100 vl	Malaysia, RTM Kuching	7160do			
1000-1100 vl	Malaysia,RTM KotaKinabalu	5980do			
1000-1025	Netherlands, Radio	5965pa	7260as	9810as	9830au
1000-1100	New Zealand, R NZ Intl	9700pa			
1000-1100 as	Palau, KHBN/Voice of Hope	9730as			
1000-1100 vl	Papua New Guinea, NBC	4890do			
1000-1100	Philippines, FEBC/R Intl	11635as			
1000-1100	Russia,Voice of Russia WS	7150va	7220as	9675pa	9835pa
		9875au	11655as	11800as	12025as
		13785as	15490as	15560as	15580as
		17755as	17860as		
1000-1025	S Africa, Investment Ch	11985af	17735va	21745va	
1000-1100	United Kingdom, BBC WS	6190af	6195am	9410eu	9740as
		11750as	11760as	11940af	12095eu
		15280as	15310as	15360as	15485va
		15565va	15575va	17640va	17705va
		17790as	17885af	21660as	
1000-1100 as	United Kingdom, BBC WS	15190am	15400am	17830af	
1000-1100	USA, KAIJ Dallas TX	5810am			
1000-1100	USA, KTBN Salt Lk City UT	7510am			
1000-1100	USA, KWHR Naalehu HI	9930as			
1000-1100	USA, Monitor Radio Intl	6095na	7395sa	9430as	13840as
1000-1100	USA, Voice of America	5985pa	6165am	7405am	9590am
		11720pa	15425pa		
1000-1100	USA, WEWN Birmingham AL	7425na	15665eu		
1000-1100	USA, WGTG McCaysville GA	9400am			
1000-1100	USA, WHRI Noblesville IN	6040am	9495am	9930am	
1000-1100	USA, WJCR Upton KY	7490na			
1000-1100 as	USA, WVHA Greenbush ME	13825af			
1000-1100	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
1000-1100	USA, WYFR Okeechobee FL	5950na			
1000-1100 vl/m-f	Vatican State, Vatican R	11740af	15210af	17550af	
1000-1030	Vietnam, Voice of	5940as	7270as	7400as	9840as
		12020as	15010as		
1000-1100	Zambia, Christian Voice	6065af			
1000-1005 mtwhfa	Zambia, ZNBC Radio 2	6165do			
1030-1055 mtwhfa	Austria, R Austria Intl	6155eu	13730eu	15240as	17870au
1030-1100	Ethiopia, Radio	5990do	7110do	9705do	
1030-1100	Guam, AWR/KSDA	9870as			
1030-1100	Netherlands, Radio	7260as	9810as		
1030-1055	S Africa, Investment Ch	11985af	17735va	21745va	
1030-1100	Sri Lanka, Sri Lanka BC	11835as	17850as		
1030-1055	UAE, Radio Dubai	13665eu	15395eu	17630eu	21605me
1044-1059 vl	Kazakhstan, Radio Almaty	11840eu			



Your Name in Lights!

... or at least in ink within the *Monitoring Times* Shortwave Guide. Please send us your "best catches" on the worldwide shortwave bands — QSLs, that is — and we will try to use them in future issues of *MT*. Your QSLs will be returned.

Frequencies

1100-1200	Australia, Radio	9580pa	9615as	9860pa	12080pa
		13605as	21725as		
1100-1200 vl	Australia, VL8A Alice Spg	2310do			
1100-1200 vl	Australia, VL8K Katherine	2485do			
1100-1200 vl	Australia, VL8T Tent Crk	2325do			
1100-1200	Canada, CFCX Montreal	6005do			
1100-1200	Canada, CFRX Toronto	6070do			
1100-1200	Canada, CFVP Calgary	6030do			
1100-1200	Canada, CHNX Halifax	6130do			
1100-1200	Canada, CKZN St John's	6160do			
1100-1200	Canada, CKZU Vancouver	6160do			
1100-1200	Costa Rica, Adv World R	7375am	9725am	13750am	
1100-1200	Costa Rica,RF Peace Intl	6205am	7385am		
1100-1200	Ecuador, HCJB	12005am	15115am	21455au	
1100-1200 as	Eqt Guinea, R East Africa	15186af			
1100-1200	Eqt Guinea, Radio Africa	9530as			
1100-1150	Germany, Deutsche Welle	15370af	15410af	17780af	17800af
1100-1200 vl	Italy, IRRS	7125va			
1100-1200	Japan, R Japan/NHK World	6120na	7125na	11815as	
1100-1200	Jordan, Radio	11690eu			
1100-1200	Lebanon, Voice of Hope	9960va			
1100-1110	Liberia,LCN/R Liberia Int	5100do			
1100-1200	Malaysia, Radio	7295do			
1100-1200 vl	Malaysia, RTM Kuching	7160do			
1100-1200 vl	Malaysia,RTM KotaKinabalu	5980do			
1100-1125	Netherlands, Radio	7260as	9810as		
1100-1200	New Zealand, R NZ Intl	9700pa			
1100-1150	North Korea, R Pyongyang	6575na	9975na	11335na	
1100-1130 as	Palau, KHBN/Voice of Hope	9730as			
1100-1200 vl	Papua New Guinea, NBC	4890do			
1100-1200	Russia,Voice of Russia WS	9705as	11655as	13785as	15120as
		15460as	15490as	15560as	17755as
		17860as			
1100-1125	S Africa, Investment Ch	11985af	17735va	21745va	
1100-1200	Singapore,R Singapore Int	6105as	6155as		
1100-1130	Sri Lanka, Sri Lanka BC	11835as	17850as		
1100-1130	Switzerland, Swiss R Intl	6165eu	9535eu	9885as	11995as
		13635as			
1100-1200	Taiwan, Voice of Asia	9280as			
1100-1200	United Kingdom, BBC WS	5965am	6190af	9410eu	11750as
		11760as	11940af	12095eu	15220am
		15310as	15485va	15565va	15575va
		17640af	17790as	17830af	17885af
		21660af			
1100-1130 as	United Kingdom, BBC WS	15190am			
1100-1130	United Kingdom, BBC WS	6195am	9700as	15400af	
1100-1200	USA, KAIJ Dallas TX	5810am	9815am		
1100-1200	USA, KTBN Salt Lk City UT	7510am			
1100-1200	USA, KWHR Naalehu HI	9930as			
1100-1200	USA, Monitor Radio Intl	6095na	7395sa	9355eu	9430au
1100-1200	USA, Voice of America	5985as	6110as	9645as	9760as
		11705as	11720as	15425as	
1100-1200	USA, WEWN Birmingham AL	7425na	15665eu		
1100-1200	USA, WGTG McCaysville GA	9400am			
1100-1200	USA, WHRI Noblesville IN	6040am	9495am	9930am	
1100-1200	USA, WJCR Upton KY	7490na			
1100-1200 as	USA, WVHA Greenbush ME	13825af			
1100-1200	USA, WWCR Nashville TN	5070am	5935am	9475am	15685am
1100-1200	USA, WYFR Okeechobee FL	5950na	7355na		
1100-1200 vl/m-f	Vatican State, Vatican R	5880eu			
1100-1130	Vietnam, Voice of	7285as	9730as		
1100-1200	Zambia, Christian Voice	6065af			
1105-1120	Pakistan, Radio	15470eu	17900eu		
1115-1127	Zambia, ZNBC Radio 1	7220do			
1115-1200	Zambia, ZNBC Radio 2	6165do			
1130-1200	Bulgaria, Radio	9440as			
1130-1200 vl	China, China Radio Intl	6995as	11445as	11700as	
1130-1157	Czech Rep, Radio Prague	7345eu	9505eu		
1130-1200	Finland, YLE/R Finland	15245as	17685au		
1130-1200	Iran, VOIRI	11875me	11930me	15260af	
1130-1200	Myanmar, Voice of	5990do			
1130-1200	Netherlands, Radio	6045eu	7190eu		
1130-1155	S Africa, Investment Ch	11985af	17735af	21745af	
1130-1200	South Korea, R Korea Intl	9650am			
1130-1200	United Kingdom, BBC WS	17705va			
1130-1200 f	Vatican State, Vatican R	15595as	17550au		
1135-1140	India, All India Radio	9595do	11620do	11710do	15185do

Selected Programs

Sundays

1100 Australia, Radio: World and Australian News. Five minutes of world news followed by five minutes of Australian news.
1100 KWHR (Hawaii): The Water of Life Broadcast. See S 0100.
1100 WHRI (Angel 1&2): The Water of Life Broadcast. See S 0100.
1120 Australia, Radio: Sports Bulletin. A report on Australian, regional and international sport (8, 10 or 20 minutes).
1130 Australia, Radio: Australia Today. Colin Tyrus presents the issues, the places, and the characters that make up Australia.

Mondays

1100 Australia, Radio: World and Asian News. See S 1200.
1100 KWHR (Hawaii): Biblical Studies Institute. See S 0400.
1100 WHRI (Angel 1&2): UPI News. See S 0400.
1105 WHRI (Angel 1&2): Music. See S 0000.
1110 Australia, Radio: Sports Bulletin. See S 1120.
1130 Australia, Radio: News Headlines. See S 2330.
1130 KWHR (Hawaii): Faith Seminar of the Air. Kenneth Hagin evangelizes.
1131 Australia, Radio: Asia Focus. See S 2310.
1145 KWHR (Hawaii): Listen to Jesus. Clinton and Sarah Outerbach from The Redeeming Love Christian Center of Nanuet, NY.

Tuesdays

1100 Australia, Radio: World and Asian News. See S 1200.
1100 KWHR (Hawaii): Music. See S 0000.
1100 WHRI (Angel 1&2): UPI News. See S 0400.
1105 WHRI (Angel 1&2): Music. See S 0000.
1110 Australia, Radio: Sports Bulletin. See S 1120.
1130 Australia, Radio: News Headlines. See S 2330.
1130 KWHR (Hawaii): Faith Seminar of the Air. See M 1130.
1131 Australia, Radio: Asia Focus. See S 2310.
1145 KWHR (Hawaii): Listen to Jesus. See M 1145.

Wednesdays

1100 Australia, Radio: World and Asian News. See S 1200.
1100 KWHR (Hawaii): Biblical Studies Institute. See S 0400.
1100 WHRI (Angel 1&2): UPI News. See S 0400.
1105 WHRI (Angel 1&2): Music. See S 0000.
1110 Australia, Radio: Sports Bulletin. See S 1120.
1130 Australia, Radio: News Headlines. See S 2330.
1130 KWHR (Hawaii): Faith Seminar of the Air. See M 1130.
1131 Australia, Radio: Asia Focus. See S 2310.
1145 KWHR (Hawaii): Listen to Jesus. See M 1145.

Thursdays

1100 Australia, Radio: World and Asian News. See S 1200.
1100 KWHR (Hawaii): Music. See S 0000.
1100 WHRI (Angel 1&2): UPI News. See S 0400.
1105 WHRI (Angel 1&2): Music. See S 0000.
1110 Australia, Radio: Sports Bulletin. See S 1120.
1130 Australia, Radio: News Headlines. See S 2330.
1130 KWHR (Hawaii): Faith Seminar of the Air. See M 1130.
1131 Australia, Radio: Asia Focus. See S 2310.
1145 KWHR (Hawaii): Listen to Jesus. See M 1145.

Fridays

1100 Australia, Radio: World and Asian News. See S 1200.
1100 KWHR (Hawaii): Biblical Studies Institute. See S 0400.
1100 WHRI (Angel 1&2): UPI News. See S 0400.
1105 WHRI (Angel 1&2): Music. See S 0000.
1110 Australia, Radio: Sports Bulletin. See S 1120.
1130 Australia, Radio: News Headlines. See S 2330.
1130 KWHR (Hawaii): Faith Seminar of the Air. See M 1130.
1131 Australia, Radio: Asia Focus. See S 2310.
1154 Radio Netherlands: Documentary. Andorra: The Mini State (14th). See A 2354.
1154 Radio Netherlands: Documentary. From the Wireless to the World Wide Web: Part 2 (7th). See W 1254.
1154 Radio Netherlands: Documentary. The Eleventh Insight (21th). See F 1454.
1154 Radio Netherlands: Documentary. The Marshall Plan (28th). See F 2354.

Saturdays

1100 Australia, Radio: World and Australian News. See S 1100.
1100 WHRI (Angel 1&2): UPI News. See S 0400.
1106 WHRI (Angel 2): The Bay Buchanan Show (repeat). See T 0306.
1120 Australia, Radio: Sports Bulletin. See S 1120.
1130 Australia, Radio: Business Week. See S 1610.

Hauser's Highlights

CHINA:

Heilongjiang PBS
Harbin, Pgm I
2100-0600 0835-1440
Mainly in Std Chinese, but Korean 0840-0940 and English 1330-1400 daily on 4840.

V. of the Strait
Fuzhou, Pgm I

2155-0200	6115, 5050, 4940
0855-0959	7280, 6115, 4940
0959-1130	7280, 6115, 5508, 4940, 4130, 2755
1130-1700	5508, 5050, 4940, 4130, 3900, 2755

Pgm II

0255-0700	9505, 6000
0955-1600	6000, 4900

Both are mainly in Std. Chinese, partly in Amoy
(BBC Monitoring)

Frequencies

1200-1300	Australia, Radio	7150as	9580pa	9615as	9710as
		9770as	9860pa	11660as	11800pa
1200-1300 vl	Australia, VL8A Alice Spg	2310do			
1200-1300 vl	Australia, VL8K Katherine	2485do			
1200-1300 vl	Australia, VL8T Tent Crk	2325do			
1200-1300	Brazil, Radio Bras	15445na			
1200-1230	Bulgaria, Radio	9440as			
1200-1215	Cambodia, Natl Voice of	11940as			
1200-1300 vl	Canada, CBC N Quebec Svc	9625do			
1200-1300	Canada, CFCX Montreal	6005do			
1200-1300	Canada, CFRX Toronto	6070do			
1200-1300	Canada, CFVP Calgary	6030do			
1200-1300	Canada, CHNX Halifax	6130do			
1200-1300	Canada, CKZN St John's	6160do			
1200-1300	Canada, CKZU Vancouver	6160do			
1200-1230	Canada, R Canada Intl	6150as	11730as		
1200-1300	China, China Radio Intl	7385na	9565as	9715as	11660as
		11795pa	15440am		
1200-1230 vl	China, China Radio Intl	6995as	11700as	12110as	
1200-1300	Costa Rica, Adv World R	5030am	6150am	9725am	13750am
1200-1300	Ecuador, HCJB	12005am	15115am	21455am	
1200-1300 as	Eqt Guinea, R East Africa	15186af			
1200-1300	Eqt Guinea, Radio Africa	9530as			
1200-1300	France, Radio France Intl	11600va	15155eu	15195eu	15530af
		15540am			
1200-1230	Iran, VOIRI	11875me	11930me	15260af	
1200-1300 vl	Italy, IRRS	7125va			
1200-1300	Jordan, Radio	11690eu			
1200-1300	Lebanon, Voice of Hope	9960va			
1200-1300	Malaysia, Radio	7295do			
1200-1300 vl	Malaysia,RTM KotaKinabalu	5980do			
1200-1250	Myanmar, Voice of	5990do			
1200-1300	Netherlands, Radio	6045eu	7190eu		
1200-1206	New Zealand, R NZ Intl	9700pa			
1200-1300 vl	Papua New Guinea, NBC	4890do			
1200-1300	Russia,Voice of Russia WS	4740as	9725as	9755as	9820as
		9875as	11655as	11880as	13785as
		15120as	17755as	17860as	
1200-1225	S Africa, Investment Ch	11985af	17735af	21745af	
1200-1300	Singapore,R Singapore Int	6105as	6155as		
1200-1300	South Korea, R Korea Intl	7285af			
1200-1300	Taiwan, VO Free China	7130au	9610as		
1200-1300	United Kingdom, BBC WS	5965am	6065as	6190af	6195va
		9410eu	9580as	9740as	11750as
		11760as	11940af	11955as	15310as
		15485va	15565va	15575me	17640af
		17705va	17830af	17885af	21660af
1200-1215	United Kingdom, BBC WS	15220am			
1200-1300	USA, KAIJ Dallas TX	5810am			
1200-1300	USA, KTBN Salt Lk City UT	7510am			
1200-1300	USA, KWHR Naalehu HI	9930as			
1200-1300	USA, Monitor Radio Intl	6095na	9355as	9430au	9455sa
1200-1300	USA, Voice of America	6110as	9760as	11705as	11715as
		15425as			
1200-1300	USA, WEWN Birmingham AL	7425na	15665eu		
1200-1300	USA, WHRI Noblesville IN	6040am	9495am		
1200-1300	USA, WJCR Upton KY	7490na			
1200-1300 as	USA, WVHA Greenbush ME	13825eu			
1200-1300	USA, WWCR Nashville TN	5935am	7435am	9475am	15685am
1200-1300	USA, WYFR Okeechobee FL	5950na	11830na	11970na	
1200-1245	USA, WYFR Okeechobee FL	7355na			
1200-1230	Uzbekistan, R Tashkent	5060as	5975as	6025as	9715as
1200-1300	Zambia, Christian Voice	6065af			
1200-1300 mtwhf	Zambia, ZNBC Radio 2	6165do			
1206-1300 occsnal	New Zealand, R NZ Intl	6105pa			
1215-1300	Egypt, Radio Cairo	17595as			
1230-1300 as	Australia, Radio	5995pa			
1230-1300	Bangladesh,Bangla Betar	7185as	9548as		
1230-1300 mtwhf	Finland, YLE/R Finland	11735na	15400na		
1230-1235	India, All India Radio	4860do	6185do	17865do	
1230-1300 w	Indonesia, RRI Sorong	4875do			
1230-1300 a	Monaco, Trans World Radio	7115eu			
1230-1255 s	Monaco, Trans World Radio	7115eu			
1230-1255	S Africa, Investment Ch	17735af	21745af		
1230-1300	South Korea, R Korea Intl	9570as	9640as	13670as	
1230-1300 mtwhf	Sri Lanka, Sri Lanka BC	9730as			
1230-1300	Sweden, Radio	11650na	15240na		
1230-1300	Thailand, Radio	9505as	9655as	9810as	
1230-1300 s	USA, WRMI/R Miami Intl	9955am			
1230-1300	Vietnam, Voice of	5940as	7270as	7400as	9840as
		12020as	15010as		
1240-1250	Greece, Voice of	11645af	15650af	17525af	

Selected Programs

Sundays

1200 Australia, Radio: World and Asian News. Five minutes of world news followed by five minutes of Asian news.
1200 Jordan, Radio: News Bulletin. An ten minute bulletin of international news.
1200 WHRI (Angel 1&2): Breakthrough. See S 0500.
1210 Australia, Radio: Charting Australia. See S 0010.
1215 Jordan, Radio: Music. A half-hour or more of popular music.
1230 Australia, Radio: Report from Asia. A weekly roundup of Asian events.
1230 Jordan, Radio: Science Report. What's new in the science and technology arena.

Mondays

1200 Australia, Radio: World and Asian News and Sport. Five minutes of world news followed by five minutes of Asian news plus a sports wrap-up.
1200 WHRI (Angel 1): Ever Increasing Faith. Fredrick "K.C." Price evangelizes from Crenshaw Christian Center in Los Angeles.
1200 WHRI (Angel 2): UPI News. See S 0400.
1205 WHRI (Angel 2): Music. See S 0000.
1210 Australia, Radio: Dateline Early Edition. See M 0010.
1215 WHRI (Angel 1): Souled Out to Jesus. Evangelizing from Cookton Park, New York.
1215 WHRI (Angel 2): Abundant Life. Walter Holland evangelizes from Texas.
1222 Australia, Radio: Business Day. An eight-minute look at the day's business developments.
1230 Australia, Radio: News Headlines. See S 2330.
1230 WHRI (Angel 1&2): The Hour of Courage. See M 0500.
1231 Australia, Radio: Australia Today. See S 1130.

Tuesdays

1200 Australia, Radio: World and Asian News and Sport. See M 1200.
1200 Jordan, Radio: News Bulletin. See S 1200.
1200 WHRI (Angel 1): Ever Increasing Faith. See M 1200.
1200 WHRI (Angel 2): UPI News. See S 0400.
1205 WHRI (Angel 2): Music. See S 0000.
1210 Australia, Radio: Dateline Early Edition. See M 0010.
1215 WHRI (Angel 1): Souled Out to Jesus. See M 1215.
1215 WHRI (Angel 2): Abundant Life. See M 1215.
1222 Australia, Radio: Business Day. See M 1222.
1230 Australia, Radio: News Headlines. See S 2330.
1230 WHRI (Angel 1&2): The Hour of Courage. See M 0500.
1231 Australia, Radio: Australia Today. See S 1130.

Wednesdays

1200 Australia, Radio: World and Asian News and Sport. See M 1200.
1200 WHRI (Angel 1): Ever Increasing Faith. See M 1200.
1200 WHRI (Angel 2): UPI News. See S 0400.
1205 WHRI (Angel 2): Music. See S 0000.
1210 Australia, Radio: Dateline Early Edition. See M 0010.
1215 WHRI (Angel 1): Souled Out to Jesus. See M 1215.
1215 WHRI (Angel 2): Abundant Life. See M 1215.
1222 Australia, Radio: Business Day. See M 1222.
1230 Australia, Radio: News Headlines. See S 2330.
1230 WHRI (Angel 1&2): The Hour of Courage. See M 0500.
1231 Australia, Radio: Australia Today. See S 1130.
1254 Radio Netherlands: Documentary. Andorra: The Mini State (12th). See A 2354.
1254 Radio Netherlands: Documentary. From the Wireless to the World Wide Web: Part 2 (5th). As Radio Netherlands celebrates its 50th anniversary this year, Pete Myers and Luc Lucas tell the fascinating story.
1254 Radio Netherlands: Documentary. The Eleventh Insight (19th). See F 1454.
1254 Radio Netherlands: Documentary. The Marshall Plan (26th). See F 2354.

Thursdays

1200 Australia, Radio: World and Asian News and Sport. See M 1200.
1200 WHRI (Angel 1): Ever Increasing Faith. See M 1200.
1200 WHRI (Angel 2): UPI News. See S 0400.
1205 WHRI (Angel 2): Music. See S 0000.
1210 Australia, Radio: Dateline Early Edition. See M 0010.
1215 WHRI (Angel 1): Souled Out to Jesus. See M 1215.
1215 WHRI (Angel 2): Abundant Life. See M 1215.
1222 Australia, Radio: Business Day. See M 1222.
1230 Australia, Radio: News Headlines. See S 2330.
1230 WHRI (Angel 1&2): The Hour of Courage. See M 0500.
1231 Australia, Radio: Australia Today. See S 1130.

Fridays

1200 Australia, Radio: World and Asian News and Sport. See M 1200.
1200 Jordan, Radio: News Bulletin. See S 1200.
1200 WHRI (Angel 1): Ever Increasing Faith. See M 1200.
1200 WHRI (Angel 2): UPI News. See S 0400.
1205 WHRI (Angel 2): Music. See S 0000.
1210 Australia, Radio: Dateline Early Edition. See M 0010.
1215 WHRI (Angel 1): Souled Out to Jesus. See M 1215.
1215 WHRI (Angel 2): Abundant Life. See M 1215.
1222 Australia, Radio: Business Day. See M 1222.
1230 Australia, Radio: News Headlines. See S 2330.
1230 WHRI (Angel 1&2): The Hour of Courage. See M 0500.
1231 Australia, Radio: Australia Today. See S 1130.

Saturdays

1200 Australia, Radio: World and Asian News. See S 1200.
1200 Jordan, Radio: News Bulletin. See S 1200.
1200 WHRI (Angel 1): Music. See S 0000.
1200 WHRI (Angel 2): UPI News. See S 0400.
1207 WHRI (Angel 2): For the People (repeat). Jerry Hughes, Bay Buchanan, and others provide talk radio from the United Broadcasting Network.
1210 Australia, Radio: Ockham's Razor. See A 0310.
1215 KWHR (Hawaii): God's Miracle Hour. Gordon Gentry evangelizes.
1230 Australia, Radio: Background Report. In-depth reports examining a broad range of influences that shape our world.
1230 KWHR (Hawaii): Day of Decision. See S 1430.
1230 WHRI (Angel 1): The Voice of Power. See M 0230.

Frequencies

1300-1400	Australia, Radio	5995pa	9580pa	9615as	11800pa
1300-1400 vl	Australia, VL8A Alice Spg	2310do			
1300-1400 vl	Australia, VL8K Katherine	2485do			
1300-1400 vl	Australia, VI8T Tent Crk	2325do			
1300-1320	Brazil, Radio Bras	15445na			
1300-1400 vl	Canada, CBC N Quebec Svc	9625do			
1300-1400	Canada, CFCX Montreal	6005do			
1300-1400	Canada, CFRX Toronto	6070do			
1300-1400	Canada, CFVP Calgary	6030do			
1300-1400	Canada, CHNX Halifax	6130do			
1300-1400	Canada, CKZN St John's	6160do			
1300-1400	Canada, CKZU Vancouver	6160do			
1300-1400	Canada, R Canada Intl	9640am	11855am		
1300-1400	China, China Radio Intl	7385na	7410as	9715as	11660pa
1300-1400	Costa Rica,RF Peace Intl	6205am	7385am		
1300-1400	Ecuador, HCJB	12005am	15115am	21455am	
1300-1330	Egypt, Radio Cairo	17595as			
1300-1400 as	Eqt Guinea, R East Africa	15186af			
1300-1400	Eqt Guinea, Radio Africa	9530as			
1300-1400 vl	Italy, IRRS	7125va			
1300-1400	Jordan, Radio	11690eu			
1300-1310	Liberia,LCN/R Liberia Int	5100do			
1300-1400	Malaysia, Radio	7295do			
1300-1400 vl	Malaysia, RTM Kuching	7160do			
1300-1400 vl	Malaysia,RTM KotaKinabalu	5980do			
1300-1400 occsnal	New Zealand, R NZ Intl	6105pa			
1300-1350	North Korea, R Pyongyang	9345as	9640eu	11740as	15230as
1300-1330 s	Norway, Radio Norway Intl	9590eu	9945as	11840na	15605au
1300-1400 vl	Papua New Guinea, NBC	4890do			
1300-1400	Philippines, FEBC/R Intl	11995as			
1300-1355	Poland, Polish R Warsaw	6095eu	7145eu	7270eu	9525eu
		11815eu			
1300-1400	Romania, R Romania Intl	9683eu	11940eu	15390eu	17745eu
1300-1400	Russia,Voice of Russia WS	4740as	4975as	9705as	15460as
		17860as			
1300-1325	S Africa, Investment Ch	17735af	17735	21745af	
1300-1400	Singapore,R Singapore Int	6105as	6155as		
1300-1400 mtwhf	Sri Lanka, Sri Lanka BC	9730as			
1300-1330	Switzerland, Swiss R Intl	7230as	7480as	12075as	13635as
1300-1400	Switzerland, Swiss R Intl	6165eu	9535eu		
1300-1400	United Kingdom, BBC WS	5965am	5990as	6065as	6190af
		6195va	9410eu	9515am	9580as
		9590am	11750as	11760as	11940af
		12095eu	15220am	15310as	15420af
		15485va	15565va	15575me	17640va
	17705va	17830af	17885af	21660af	
1300-1400	USA, KAIJ Dallas TX	5810am			
1300-1400	USA, KNLS Anchor Point AK	7365as			
1300-1400	USA, KTBN Salt Lk City UT	7510am			
1300-1400	USA, KWHR Naalehu HI	9930as			
1300-1400	USA, Monitor Radio Intl	6095na	9355as	9455am	13840as
1300-1400	USA, Voice of America	6110as	9645as	9760as	11705as
		11715as	15425as		
1300-1400	USA, WEWN Birmingham AL	7425na	11875na	15665eu	
1300-1400	USA, WGTG McCaysville GA	9400am			
1300-1400	USA, WHRI Noblesville IN	6040am	15105am		
1300-1400	USA, WJCR Upton KY	7490na			
1300-1400 s	USA, WRMI/R Miami Intl	9955am			
1300-1400	USA, WWCR Nashville TN	5935am	7435am	9475am	
1300-1400	USA, WYFR Okeechobee FL	5950na	11830na	13695na	
1300-1345	USA, WYFR Okeechobee FL	11970am			
1300-1400	Zambia, Christian Voice	6065af			
1300-1330 mtwhf	Zambia, ZNBC Radio 2	6165do			
1303-1010 as	Croatia, Croatian Radio	5895eu	5920eu	7165eu	9830eu
		11635eu	11830eu	13830eu	
1315-1400 mtwhfa	Bhutan, Bhutan BC Service	5030do			
1330-1355	Austria, R Austria Intl	6155eu	13730na		
1330-1355 s	Belgium, R Vlaanderen Int	13685va	13795va		
1330-1357	Canada, R Canada Intl	6150as	9535as		
1330-1400	China, Heilongjiang PBS	4840do			
1330-1400	Finland, YLE/R Finland	11735na	15400na		
1330-1400	Guam, AWR/KSDA	9650as			
1330-1400	India, All India Radio	11620as	13750as		
1330-1400	Mongolia, Voice of	12085as			
1330-1400	Netherlands, Radio	9895as	13700as	15585as	
1330-1355	S Africa, Investment Ch	17735af	21745af		
1330-1400	Sweden, Radio	7155as	15240pa		
1330-1400	Turkey, Voice of	9445eu	9630as		
1330-1355	UAE, Radio Dubai	13665eu	15395eu	17630eu	21605me
1330-1400 mtwhf	USA, WRMI/R Miami Intl	9955am			
1330-1400	Uzbekistan, R Tashkent	5060as	5975as	6025as	9715as
1330-1400	Vietnam, Voice of	5940eu	7270eu	7400eu	9840eu
		12020eu	15010eu		
1330-1400	Yugoslavia, Radio	11835eu			
1345-1400	Anguilla,Caribbean Beacon	11775am			
1345-1400	Vatican State, Vatican R	9500as	11625as		

Selected Programs

Sundays

1300 Australia, Radio: World and Australian News. See S 1100.
1300 KWHR (Hawaii): Christ Gospel Broadcast. BR Hicks with a Bible lesson.
1300 WHRI (Angel 1): Alive Today. Dwayne Johnson with a short evangelical message.
1300 WHRI (Angel 2): In Touch. The Atlanta Bible-teaching ministry of Charles Stanley.
1310 Australia, Radio: The Europeans. See S 0110.
1330 KWHR (Hawaii): The Call to Worship. Bernie Timmerman with services from Zion Chapel, Holland, Michigan.

Mondays

1300 Australia, Radio: World and Australian News and Sport. See M 0500.
1300 WHRI (Angel 2): The Voice of Praise. Pastor Kenneth Ivey teaches from the word of God.
1310 Australia, Radio: Dateline. See M 0110.
1315 WHRI (Angel 1&2): Reach Out. Pastor Jerry Lynn, Calvary Chapel of Albany, New York with Bible teaching.
1330 WHRI (Angel 1&2): Faith Seminar of the Air. See M 1130.
1345 WHRI (Angel 1): Abundant Life. See M 1215.
1345 WHRI (Angel 2): Life in the Word. Joyce Meyer offers help by example for everyday living.

Tuesdays

1300 Australia, Radio: World and Australian News and Sport. See M 0500.
1300 WHRI (Angel 2): The Voice of Praise. See M 1300.
1310 Australia, Radio: Dateline. See M 0110.
1315 WHRI (Angel 1&2): Reach Out. See M 1315.
1330 WHRI (Angel 1&2): Faith Seminar of the Air. See M 1130.
1345 WHRI (Angel 1): Abundant Life. See M 1215.
1345 WHRI (Angel 2): Life in the Word. See M 1345.

Wednesdays

1300 Australia, Radio: World and Australian News and Sport. See M 0500.
1300 WHRI (Angel 2): The Voice of Praise. See M 1300.
1310 Australia, Radio: Dateline. See M 0110.
1315 WHRI (Angel 1&2): Reach Out. See M 1315.
1330 WHRI (Angel 1&2): Faith Seminar of the Air. See M 1130.
1345 WHRI (Angel 1): Abundant Life. See M 1215.
1345 WHRI (Angel 2): Life in the Word. See M 1345.
1354 Radio Netherlands: Documentary. Andorra: The Mini State (12th). See A 2354.
1354 Radio Netherlands: Documentary. From the Wireless to the World Wide Web: Part 2 (5th). See W 1254.
1354 Radio Netherlands: Documentary. The Eleventh Insight (19th). See F 1454.
1354 Radio Netherlands: Documentary. The Marshall Plan (26th). See F 2354.

Thursdays

1300 Australia, Radio: World and Australian News and Sport. See M 0500.
1300 WHRI (Angel 2): The Voice of Praise. See M 1300.
1310 Australia, Radio: Dateline. See M 0110.
1315 WHRI (Angel 1&2): Reach Out. See M 1315.
1330 WHRI (Angel 1&2): Faith Seminar of the Air. See M 1130.
1345 WHRI (Angel 1): Abundant Life. See M 1215.
1345 WHRI (Angel 2): Life in the Word. See M 1345.

Fridays

1300 Australia, Radio: World and Australian News and Sport. See M 0500.
1300 WHRI (Angel 2): The Voice of Praise. See M 1300.
1310 Australia, Radio: Dateline. See M 0110.
1315 WHRI (Angel 1&2): Reach Out. See M 1315.
1330 WHRI (Angel 1&2): Faith Seminar of the Air. See M 1130.
1345 WHRI (Angel 1): Abundant Life. See M 1215.
1345 WHRI (Angel 2): Life in the Word. See M 1345.

Saturdays

1300 Australia, Radio: World and Australian News. See S 1100.
1300 KWHR (Hawaii): Spirit of Truth. Don Young offers words of encouragement and joy.
1300 WHRI (Angel 1): UPI News. See S 0400.
1300 WHRI (Angel 2): The Gospel Trumpet Broadcast. Joel Beeke from the 1st Netherlands Reformed Church in Grand Rapids, Michigan.
1305 WHRI (Angel 1&2): Music. See S 0000.
1310 Australia, Radio: Business Week. See S 1610.
1315 KWHR (Hawaii): Bible Pathway. See S 1445.
1320 KWHR (Hawaii): How to Manage Your Money. Larry Burkett
1325 KWHR (Hawaii): Faith in Action. Betty Potterbaum of Hawaii interprets the Bible.
1330 Australia, Radio: Australia Today. See S 1130.
1330 KWHR (Hawaii): Christ Gospel Broadcast. See S 1300.
1330 WHRI (Angel 2): The Voice of Salvation. William Wilson of the Church of God of Prophecy presents music and inspiration.
1345 KWHR (Hawaii): The Bread of Life Victory Hour. Brother Jack Meeks with music and teaching.

Frequencies

1400-1500	Algeria, R Algiers Intl	11715eu	15160eu	15205eu	
1400-1500	Australia, Radio	5995pa	9580pa	9860pa	11660as
		11800pa	12080pa		
1400-1500 vl	Australia, VL8A Alice Spg	2310do			
1400-1500 vl	Australia, VL8K Katherine	2485do			
1400-1500 vl	Australia, VI8T Tent Crk	2325do			
1400-1425 mtwhfa	Belgium, R Vlaanderen Int	13685na	13795as		
1400-1500 vl	Canada, CBC N Quebec Svc	9625do			
1400-1500	Canada, CFCX Montreal	6005do			
1400-1500	Canada, CFRX Toronto	6070do			
1400-1500	Canada, CFVP Calgary	6030do			
1400-1500	Canada, CHNX Halifax	6130do			
1400-1500	Canada, CKZN St John's	6160do			
1400-1500	Canada, CKZU Vancouver	6160do			
1400-1500 s	Canada, R Canada Intl	9640am	11855am		
1400-1500	China, China Radio Intl	7405na	9535as	9785as	
1400-1500	Costa Rica,RF Peace Intl	6205am	7385am		
1400-1430	Czech Rep, Radio Prague	13580eu	17485af		
1400-1500	Ecuador, HCJB	12005am	15115am	21455am	
1400-1500 as	Eqt Guinea, R East Africa	15186af			
1400-1500	France, Radio France Intl	7110as	12030af	17560me	
1400-1500	India, All India Radio	11620as	13750as		
1400-1430 vl	Italy, IRRS	7125va			
1400-1500	Japan, R Japan/NHK World	7125na	7200na	9535na	11705na
		11880as	11895as	12045as	
1400-1500	Jordan, Radio	11690eu			
1400-1500	Malaysia, Radio	7295do			
1400-1500 vl	Malaysia, RTM Kuching	7160do			
1400-1500 vl	Malaysia,RTM KotaKinabalu	5980do			
1400-1500	Netherlands, Radio	9895as	13700as	15585as	
1400-1500 occsnal	New Zealand, R NZ Intl	6105pa			
1400-1430 s	Norway, Radio Norway Intl	11725as	11840as	11850as	
1400-1410	Pakistan, Radio	9645as	9900as	11570me	
1400-1500 vl	Papua New Guinea, NBC	4890do			
1400-1500	Philippines, FEBC/R Intl	11995as			
1400-1500	Russia,Voice of Russia WS	7130me	7165me	9470me	9840me
		15205me			
1400-1425	S Africa, Investment Ch	17735me	21745me		
1400-1500	Sri Lanka, Sri Lanka BC	9730as			
1400-1430	Thailand, Radio	9530as	9655as	11905as	
1400-1430	Turkey, Voice of	9445eu	9630as		
1400-1500	United Kingdom, BBC WS	5990as	6190af	6195as	9410eu
		9515am	9590am	11750as	11940af
		12095eu	15220am	15310as	15485va
		15565va	15575me	17640va	17705va
		17840am			
1400-1500	USA, KAIJ Dallas TX	13815am			
1400-1500	USA, KJES Mesquite NM	11715na			
1400-1500	USA, KTBN Salt Lk City UT	7510am			
1400-1500	USA, Monitor Radio Intl	9355as			
1400-1500	USA, Voice of America	6110as	7125as	7215as	9645as
		9760as	11705as	15205me	15395as
		15425as			
1400-1500	USA, WEWN Birmingham AL	9455na	11875na	15665eu	
1400-1500	USA, WGTG McCaysville GA	9400am			
1400-1500	USA, WHRI Noblesville IN	6040am	15105am		
1400-1500	USA, WJCR Upton KY	7490na			
1400-1500 mtwhf	USA, WRMI/R Miami Intl	9955am			
1400-1500 s	USA, WRMI/R Miami Intl	9955am			
1400-1500 as	USA, WVHA Greenbush ME	15745na			
1400-1500	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1400-1500	USA, WYFR Okeechobee FL	5950na	11830na	17760eu	
1400-1405	Vatican State, Vatican R	9500as	11625as		
1400-1500	Zambia, Christian Voice	6065af			
1400-1405 mtwhf	Zambia, ZNBC Radio 2	6165do			
1415-1425	Nepal, Radio	7165do			
1420-1500 as	Palau, KHBN/Voice of Hope	9985as			
1430-1500	Canada, R Canada Intl	9555me	11915af	11935me	15325me
1430-1500 vl	China, China Radio Intl	6995as	8660as	9880as	11445as
1430-1440	India, All India Radio	3945do	6185do	9565do	9685do
1430-1440 mtwhf	Indonesia, RRI Uj Pandang	4753do			
1430-1500 vl	Italy, IRRS	3985va			
1430-1500 mtwhf	Portugal, R Portugal Intl	21515as			
1430-1500	Romania, R Romania Intl	11740as	15335as		
1430-1455	S Africa, Investment Ch	17735me	21745me		
1430-1500	Sweden, Radio	9485as	11650na	15240na	
1430-1500	United Kingdom, BBC WS	15400af	17830af	21660af	
1435-1445	Greece, Voice of	11645na	15170na		
1440-1500	Myanmar, Voice of	5990do			

Selected Programs

Sundays

1400 Australia, Radio: World and Asian News. See S 1200.
1400 Jordan, Radio: News Summary. The world news in brief.
1400 WHRI (Angel 1&2): Gospel Crusade Ministries. See S 0400.
1403 Jordan, Radio: Music. See S 1215.
1410 Australia, Radio: Sports Bulletin. See S 1120.
1430 Australia, Radio: The Sports Factor. A program that investigates the passions, controversies and politics of sport.
1430 KWHR (Hawaii): Day of Decision. Bob Roman evangelizes from Texas.
1430 WHRI (Angel 1): Truth for the World. Churches of Christ spokesman Jim Dearman examines Scripture.
1430 WHRI (Angel 2): The Banner of Truth Broadcast. Sponsored by the Free Reformed Churches of North America.
1445 WHRI (Angel 1&2): Bible Pathway. Rick Hash with five minutes of Bible readings.
1450 WHRI (Angel 2): Music. See S 0000.

Mondays

1400 Australia, Radio: World and Asian News. See S 1200.
1400 Jordan, Radio: News Summary. See S 1400.
1400 WHRI (Angel 1&2): World Harvest. See M 0600.
1403 Jordan, Radio: Music. See S 1215.
1410 Australia, Radio: Sports Bulletin. See S 1120.
1418 Australia, Radio: Business Day. See M 1222.
1426 Australia, Radio: Around Australia. See M 0210.
1430 Australia, Radio: News Headlines. See S 2330.
1431 Australia, Radio: Innovations. See M 0031.

Tuesdays

1400 Australia, Radio: World and Asian News. See S 1200.
1400 Jordan, Radio: News Summary. See S 1400.
1400 WHRI (Angel 1&2): World Harvest. See M 0600.
1403 Jordan, Radio: Music. See S 1215.
1410 Australia, Radio: Sports Bulletin. See S 1120.
1418 Australia, Radio: Business Day. See M 1222.
1426 Australia, Radio: Around Australia. See M 0210.
1430 Australia, Radio: News Headlines. See S 2330.
1431 Australia, Radio: Arts Australia. See T 0031.

Wednesdays

1400 Australia, Radio: World and Asian News. See S 1200.
1400 Jordan, Radio: News Summary. See S 1400.
1400 WHRI (Angel 1&2): World Harvest. See M 0600.
1403 Jordan, Radio: Music. See S 1215.
1410 Australia, Radio: Sports Bulletin. See S 1120.
1418 Australia, Radio: Business Day. See M 1222.
1426 Australia, Radio: Around Australia. See M 0210.
1430 Australia, Radio: News Headlines. See S 2330.
1431 Australia, Radio: Science File. See W 0031.

Thursdays

1400 Australia, Radio: World and Asian News. See S 1200.
1400 Jordan, Radio: News Summary. See S 1400.
1400 WHRI (Angel 1&2): World Harvest. See M 0600.
1403 Jordan, Radio: Music. See S 1215.
1410 Australia, Radio: Sports Bulletin. See S 1120.
1418 Australia, Radio: Business Day. See M 1222.
1426 Australia, Radio: Around Australia. See M 0210.
1430 Australia, Radio: News Headlines. See S 2330.
1431 Australia, Radio: Book Talk. See H 0031.

Fridays

1400 Australia, Radio: World and Asian News. See S 1200.
1400 Jordan, Radio: News Summary. See S 1400.
1400 WHRI (Angel 1&2): World Harvest. See M 0600.
1403 Jordan, Radio: Music. See S 1215.
1410 Australia, Radio: Sports Bulletin. See S 1120.
1418 Australia, Radio: Business Day. See M 1222.
1426 Australia, Radio: Around Australia. See M 0210.
1430 Australia, Radio: News Headlines. See S 2330.
1431 Australia, Radio: The Words to Say It. See F 0031.
1454 Radio Netherlands: Documentary. Andorra: The Mini State (14th). See A 2354.
1454 Radio Netherlands: Documentary. From the Wireless to the World Wide Web: Part 2 (7th). See W 1254.
1454 Radio Netherlands: Documentary. The Eleventh Insight (21th). Theo Tamis looks at achieving personal growth in Holland.
1454 Radio Netherlands: Documentary. The Marshall Plan (28th). See F 2354.

Saturdays

1400 Australia, Radio: World and Asian News. See S 1200.
1400 Jordan, Radio: News Summary. See S 1400.
1400 WHRI (Angel 1): Listen to Jesus. See M 1145.
1410 Australia, Radio: Sports Bulletin. See S 1120.
1430 Australia, Radio: The Health Report. See A 0430.
1430 KWHR (Hawaii): The Hour of Decision. Old-fashioned preaching from Oklahoma.
1430 WHRI (Angel 1): Eternal Good News. See S 0630.
1430 WHRI (Angel 2): Biblical Studies Institute. See S 0400.
1445 WHRI (Angel 1): Word of Faith. Aaron Collins preaches from Jesus is Lord World Outreach Center in Racine, Wisconsin.

Frequencies

1500-1600	Australia, Radio	5995pa	6060pa	6080pa	7380as
		9580pa	9615as	11660as	11800pa
		12080pa			
1500-1600 vl	Australia, VL8A Alice Spg	2310do			
1500-1600 vl	Australia, VL8K Katherine	2485do			
1500-1600 vl	Australia, VL8T Tent Crk	2325do			
1500-1600 vl	Canada, CBC N Quebec Svc	9625do			
1500-1600	Canada, CFCX Montreal	6005do			
1500-1600	Canada, CFRX Toronto	6070do			
1500-1600	Canada, CFVP Calgary	6030do			
1500-1600	Canada, CHNX Halifax	6130do			
1500-1600	Canada, CKZN St John's	6160do			
1500-1600	Canada, CKZU Vancouver	6160do			
1500-1600 s	Canada, R Canada Intl	9640am	11855am		
1500-1600	China, China Radio Intl	7405na	9535as	9785as	
1500-1600	Costa Rica,RF Peace Intl	6205am	7385am		
1500-1600	Ecuador, HCJB	12005am	15115am	21455am	
1500-1600 as	Eqt Guinea, R East Africa	15186af			
1500-1600	Guam, TWR/KTWR	11580as			
1500-1600 t	Ireland,W Coast R Ireland	6015eu			
1500-1530	Israel, Kol Israel	9390na	11605na		
1500-1600 vl	Italy, IRRS	3985va			
1500-1600	Japan, R Japan/NHK World	7200af	7240af	7240af	9535na
		15355af			
1500-1600	Jordan, Radio	11690eu			
1500-1510	Liberia,LCN/R Liberia Int	5100do			
1500-1600	Malaysia, Radio	7295do			
1500-1600 vl	Malaysia, RTM Kuching	7160do			
1500-1600 vl	Malaysia,RTM KotaKinabalu	5980do			
1500-1530	Mexico, Radio Mexico Intl	9705na			
1500-1515 s	Myanmar, Voice of	5990do			
1500-1525	Netherlands, Radio	9895as	13700as	15585as	
1500-1600 occsnal	New Zealand, R NZ Intl	6105pa			
1500-1550	North Korea, R Pyongyang	9325eu	9640eu	9975na	13785me
1500-1530 as	Palau, KHBN/Voice of Hope	9985as			
1500-1600 vl	Papua New Guinea, NBC	4890do			
1500-1600	Philippines, FEBC/R Intl	11995as			
1500-1530	Romania, R Romania Intl	11740as	15335as		
1500-1600 vl/s	Russia, Voice of Assyria	7325do	9730do	9880do	
1500-1600	Russia,Voice of Russia WS	4740me	4940me	4975me	5925me
		7115af	7130me	7165me	9470af
		9585af	9635me	9840me	15205me
1500-1600	S Africa, Channel Africa	7155af	9685af		
1500-1525	S Africa, Channel Africa	17735va	21745va		
1500-1600 mtwhfa	Seychelles, FEBA Radio	9810as			
1500-1545 s	Seychelles, FEBA Radio	11600as			
1500-1515 wh	Seychelles, FEBA Radio	11870as			
1500-1530 mt fa	Seychelles, FEBA Radio	11870as			
1500-1600	Singapore,R Corp of Sing	6155do			
1500-1530	Switzerland, Swiss R Intl	9885as	12075as	13635as	
1500-1600	United Kingdom, BBC WS	5975as	5990as	6190af	6195as
		9410va	9515na	9590am	9740am
		11750as	12095as	15220am	15400af
		15485af	15565va	15575eu	17640va
		17705eu	17830af	17840am	21470af
		21660af			
1500-1530	United Kingdom, BBC WS	11860af	11940af	15420af	17880af
		21490af			
1500-1600	USA, KAIJ Dallas TX	13815am			
1500-1600	USA, KTBN Salt Lk City UT	7510am			
1500-1600	USA, Monitor Radio Intl	9355as			
1500-1600	USA, Voice of America	6110as	7125as	7215as	9575me
		9645as	9760as	15205as	15395as
1500-1600	USA, WEWN Birmingham AL	9455na	11875na	15665eu	
1500-1600	USA, WGTG McCaysville GA	9400am			
1500-1600	USA, WHRI Noblesville IN	13760am	15105am		
1500-1600	USA, WJCR Upton KY	7490na			
1500-1600	USA, WRNO New Orleans LA	7395am			
1500-1600 as	USA, WVHA Greenbush ME	15745na			
1500-1600	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1500-1600	USA, WYFR Okeechobee FL	11830na	17760na		
1500-1600	Zambia, Christian Voice	6065af			
1530-1555	Austria, R Austria Intl	6155as	9655me	11780as	13730af
1530-1545	India, All India Radio	3945do	6185do	7140do	7410do
		9530do	9565do	9685do	9700do
		9910do	11740do		
1530-1600	Iran, VOIRI	7290as	9635as		
1530-1600	Mongolia, Voice of	9745eu	12025au		
1530-1600	Netherlands, Radio	9895as	12090as		
1530-1555	S Africa, Investment Ch	17735va	21745va		
1530-1600 mtwhf	Sri Lanka, Sri Lanka BC	9730as			
1530-1600 mtwhf	United Kingdom, BBC WS	7180as			
1530-1600	United Kingdom, BBC WS	17705va			
1545-1600	Pakistan, Radio	9425as	9515as	11570af	11955af
		13590af	15555af		
1550-1600 a/vl	Vatican State, Vatican R	9940as	11640as		

Selected Programs

Sundays

1500 Australia, Radio: World and Australian News. See S 1100.
1500 Jordan, Radio: Listeners' Choice. Popular music selections requested by listeners.
1500 WHRI (Angel 1&2): Christian Center Church (live). Steve Sumrall preaches from Christian Center of Praise in Noblesville, Indiana.
1510 Australia, Radio: Oz Sounds #2. Twenty minutes of music selections by Radio Australia announcers.
1530 Australia, Radio: Fine Music Australia. See S 0530.
1550 WHRI (Angel 1): Music. See S 0000.

Mondays

1500 Australia, Radio: World and Australian News and Sport. See M 0500.
1500 Jordan, Radio: Program Review. The program line-up for today is outlined, but in Jordan time.
1500 WHRI (Angel 1): UPI News. See S 0400.
1500 WHRI (Angel 2): Music. See S 0000.
1503 Jordan, Radio: Music. See S 1215.
1505 WHRI (Angel 1): Music. See S 0000.
1510 Australia, Radio: Asia Focus. See S 2310.
1530 Australia, Radio: News Headlines. See S 2330.
1531 Australia, Radio: Australia Today. See S 1130.

Tuesdays

1500 Australia, Radio: World and Australian News and Sport. See M 0500.
1500 Jordan, Radio: Program Review. See M 1500.
1500 WHRI (Angel 1): UPI News. See S 0400.
1500 WHRI (Angel 2): Music. See S 0000.
1502 Jordan, Radio: Women. A review of the human rights situation of women and girls around the world.
1505 WHRI (Angel 1): Music. See S 0000.
1510 Australia, Radio: Asia Focus. See S 2310.
1530 Australia, Radio: News Headlines. See S 2330.
1530 Jordan, Radio: Pop Breaker. A half-hour of recently released recordings.
1531 Australia, Radio: Australia Today. See S 1130.

Wednesdays

1500 Australia, Radio: World and Australian News and Sport. See M 0500.
1500 Jordan, Radio: Program Review. See M 1500.
1500 WHRI (Angel 1): UPI News. See S 0400.
1500 WHRI (Angel 2): Music. See S 0000.
1502 Jordan, Radio: Jordan Weekly. See T 1215.
1505 WHRI (Angel 1): Music. See S 0000.
1510 Australia, Radio: Asia Focus. See S 2310.
1530 Australia, Radio: News Headlines. See S 2330.
1531 Australia, Radio: Australia Today. See S 1130.
1531 Jordan, Radio: Feature Series. A series of quarter-hour programs dealing with a variety of subjects.
1545 Jordan, Radio: Pop Session. The history of British pop music.
1554 Radio Netherlands: Documentary. Andorra: The Mini State (12th). See A 2354.
1554 Radio Netherlands: Documentary. From the Wireless to the World Wide Web: Part 2 (5th). See W 1254.
1554 Radio Netherlands: Documentary. The Eleventh Insight (19th). See F 1454.
1554 Radio Netherlands: Documentary. The Marshall Plan (26th). See F 2354.

Thursdays

1500 Australia, Radio: World and Australian News and Sport. See M 0500.
1500 Jordan, Radio: Program Review. See M 1500.
1500 WHRI (Angel 1): UPI News. See S 0400.
1500 WHRI (Angel 2): Music. See S 0000.
1502 Jordan, Radio: New Horizons. A London-produced program about innovations in technology.
1505 WHRI (Angel 1): Music. See S 0000.
1510 Australia, Radio: Asia Focus. See S 2310.
1530 Australia, Radio: News Headlines. See S 2330.
1531 Australia, Radio: Australia Today. See S 1130.
1532 Jordan, Radio: Pop Session. See W 1545.

Fridays

1500 Australia, Radio: World and Australian News and Sport. See M 0500.
1500 Jordan, Radio: Program Review. See M 1500.
1500 WHRI (Angel 1): UPI News. See S 0400.
1500 WHRI (Angel 2): Music. See S 0000.
1502 Jordan, Radio: In Concert. Recordings of live pop/rock music concerts.
1505 WHRI (Angel 1): Music. See S 0000.
1510 Australia, Radio: Asia Focus. See S 2310.
1515 KWHR (Hawaii): Life in the Word. See M 1345.
1530 Australia, Radio: News Headlines. See S 2330.
1531 Australia, Radio: Australia Today. See S 1130.

Saturdays

1500 Australia, Radio: World and Australian News. See S 1100.
1500 Jordan, Radio: Program Review. See M 1500.
1500 WHRI (Angel 1): UPI News. See S 0400.
1500 WHRI (Angel 2): Bible Pathway. See S 1445.
1502 Jordan, Radio: Jordan Weekly. See T 1215.
1505 WHRI (Angel 1): Home Schooling (live). See A 0100.
1505 WHRI (Angel 2): The People's Lawyer. Legal advice for the average citizen as well as employers.
1510 Australia, Radio: Oz Sounds #1. See S 1510.
1515 WHRI (Angel 2): Heartfelt Ministries. Advice from the heart.
1530 Australia, Radio: Business Week. See S 1610.
1530 Jordan, Radio: Music. See S 1215.
1530 KWHR (Hawaii): Rhema Radio Church. Kenneth Hagin, Jr. preaches from Tulsa, Oklahoma.
1530 WHRI (Angel 2): Music. See S 0000.

1600 UTC SHORTWAVE GUIDE 11:00 AM EST 8:00 AM PST

Frequencies

1600-1700	Australia, Radio	5995pa	6060pa	6080pa	6090pa
		9580pa	9615pa	9860pa	11660pa
		11800pa	12080pa		
1600-1700 vl	Australia, VL8A Alice Spg	2310do			
1600-1700 vl	Australia, VL8K Katherine	2485do			
1600-1700 vl	Australia, VL8T Tent Crk	2325do			
1600-1700 vl	Canada, CBC N Quebec Svc	9625do			
1600-1700	Canada, CFCX Montreal	6005do			
1600-1700	Canada, CFRX Toronto	6070do			
1600-1700	Canada, CFVP Calgary	6030do			
1600-1700	Canada, CHNX Halifax	6130do			
1600-1700	Canada, CKZN St John's	6160do			
1600-1700	Canada, CKZU Vancouver	6160do			
1600-1700 s	Canada, R Canada Intl	9640am	11855am		
1600-1700	China, China Radio Intl	15110af	15130af		
1600-1700	Costa Rica,RF Peace Intl	6205am	7385am		
1600-1700	Ethiopia, Radio	7165af	9560af	11800af	
1600-1700	France, Radio France Intl	6175eu	9485af	11615me	11700af
		12015af	15530af		
1600-1650	Germany, Deutsche Welle	6150as	6170as	7225as	7305as
		9585as			
1600-1700	Germany, Deutsche Welle	7195af	9735af	11810af	13610af
		15145af			
1600-1700	Guam, AWR/KSDA	7395as			
1600-1630	Iran, VOIRI	7290as	9635as		
1600-1700 vl	Italy, IRRS	3985va			
1600-1700	Jordan, Radio	11690eu			
1600-1700	Malaysia, Radio	7295do			
1600-1630	Mexico, Radio Mexico Intl	9705na			
1600-1625	Netherlands, Radio	9895as	12090as		
1600-1650 occsnal	New Zealand, R NZ Intl	6105pa			
1600-1630 s	Norway, Radio Norway Intl	9590af	9985eu	11840na	
1600-1630	Pakistan, Radio	7230as	9425as	9515as	11570af
		11955af	13590af	15555af	
1600-1700 vl	Papua New Guinea, NBC	4890do			
1600-1700	Russia,Voice of Russia WS	4740me	4940me	4975me	6175me
		7115af	7175af	7210af	7275af
		7330eu	9470me	9505me	9550af
		9585af	9635af	11865af	13670af
		15205me			
1600-1700 sm	Russia,Voice of Russia WS	6005me			
1600-1700	S Africa, Channel Africa	7155af	9685af	15240af	
1600-1625	S Africa, Investment Ch	17735va			
1600-1700	Singapore,R Corp of Sing	6155do			
1600-1700	Slovakia, Adv World Radio	13590as			
1600-1700	South Korea, R Korea Intl	5975eu	9515af	9870af	
1600-1700	Swaziland, Trans World R	9500af			
1600-1640	UAE, Radio Dubai	11795me	13675eu	15395me	17825me
1600-1700	United Kingdom, BBC WS	3915as	5975as	6190af	7135va
		9410va	9515am	11940af	12095as
		15400af	15485eu	17830af	17840am
		21470af	21660af		
1600-1615 mtwhf	United Kingdom, BBC WS	7180as			
1600-1615	United Kingdom, BBC WS	5990as	6195as	9510as	9740as
		15420af	15575va	17705af	
1600-1615 as	United Kingdom, BBC WS	11860af			
1600-1700	USA, KAIJ Dallas TX	13815am			
1600-1700	USA, KTBN Salt Lk City UT	15590am			
1600-1700	USA, KWHR Naalehu HI	6120as			
1600-1700	USA, Monitor Radio Intl	9355eu	9385af		
1600-1700	USA, Voice of America	6035af	6110as	7125as	7215as
		9575as	9645as	9760as	11920af
		12040af	13600af	13710af	15205af
		15225af	15395as	15410af	15445af
		17895af			
1600-1700	USA, WEWN Birmingham AL	11875na	13615na	15665eu	
1600-1700	USA, WGTG McCaysville GA	9400am			
1600-1700	USA, WHRI Noblesville IN	13760am	15105am		
1600-1700	USA, WJCR Upton KY	7490na			
1600-1700	USA, WRNO New Orleans LA	7355am			
1600-1700 as	USA, WVHA Greenbush ME	15745va			
1600-1700	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1600-1700	USA, WYFR Okeechobee FL	11830na	15215na	15695eu	17555eu
		17760eu	21525af		
1600-1630 a	Vatican State, Vatican R	9940as	11640as		
1600-1620 smtwhf	Vatican State, Vatican R	9940as	11640as		
1600-1630	Vietnam, Voice of	7400eu	9840eu		
1600-1700	Zambia, Christian Voice	3330af			
1600-1610 mtwhfa	Zambia, ZNBC Radio 2	6165do			
1615-1700	United Kingdom, BBC WS	9510as	11860af		
1615-1630	Vatican State, Vatican R	5880eu	7250eu	9645eu	11810eu
1620-1630 mtwhf	Estonia, Radio	5925eu			
1630-1655	Austria, R Austria Intl	11780as			
1630-1700	Canada, R Canada Intl	7150as	9550as		
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700	Georgia, Radio	6230me			
1630-1655	S Africa, Investment Ch	17735va			
1630-1700	Slovakia, Adv World Radio	15620af			
1645-1700 irreg	Afghanistan, Radio	7200as			
1650-1700	Egt Guinea, Radio Africa	15186af			
1650-1700 mtwhf	New Zealand, R NZ Intl	6070pa			

Selected Programs

Sundays

1600 Australia, Radio: World News. See S 0000.
1600 Jordan, Radio: News Summary. See S 1400.
1600 WHRI (Angel 1&2): Message to Israel. A program for Jewish listeners from Brooklyn, NY.
1603 Jordan, Radio: Listeners' Choice. See S 1500.
1610 Australia, Radio: Business Week. Review of developments in business and finance in the Asia Pacific region.
1615 WHRI (Angel 1&2): The Bread of Life Broadcast. Ron Kresge preaches from the Church of God at Norwalk, Connecticut.
1630 Australia, Radio: Report from Asia. See S 1230.
1630 WHRI (Angel 2): Sandra Davis Ministries. Sandra Davis evangelizes from Massachusetts.

Mondays

1600 Australia, Radio: World News and Sport. Ten minutes of news from around the world with a sports wrap-up.
1600 Jordan, Radio: News Summary. See S 1400.
1600 WHRI (Angel 1): Bible Pathway. See S 1445.
1600 WHRI (Angel 2): UPI News. See S 0400.
1604 Jordan, Radio: On the Air if You Dare. A live, two-hour quiz program during which listeners call in and win prizes.
1605 WHRI (Angel 2): Our Foundation. Ken Miller shares five minutes of inspiration.
1606 WHRI (Angel 1): Music. See S 0000.
1610 Australia, Radio: Dateline. See M 0110.
1610 WHRI (Angel 2): Five Minutes to Victory. William Wilson of the Church of God of Prophecy with a Christian anecdote.
1615 WHRI (Angel 2): Ever Increasing Faith. See M 1200.
1630 WHRI (Angel 2): The Voice of Power. See M 0230.
1645 WHRI (Angel 2): Reach Out. See M 1315.

Tuesdays

1600 Australia, Radio: World News and Sport. See M 1600.
1600 Jordan, Radio: News Summary. See S 1400.
1600 KWHR (Hawaii): Music. See S 0000.
1600 WHRI (Angel 1): Bible Pathway. See S 1445.
1600 WHRI (Angel 2): UPI News. See S 0400.
1604 Jordan, Radio: Classical Jam. The program that goes beyond classical music.
1605 WHRI (Angel 2): Our Foundation. See M 1605.
1606 WHRI (Angel 1): Music. See S 0000.
1610 Australia, Radio: Dateline. See M 0110.
1610 WHRI (Angel 2): Five Minutes to Victory. See M 1610.
1615 WHRI (Angel 2): Ever Increasing Faith. See M 1200.
1630 WHRI (Angel 2): The Voice of Power. See M 0230.
1645 WHRI (Angel 2): Reach Out. See M 1315.

Wednesdays

1600 Australia, Radio: World News and Sport. See M 1600.
1600 Jordan, Radio: News Summary. See S 1400.
1600 KWHR (Hawaii): Music. See S 0000.
1600 WHRI (Angel 1): Bible Pathway. See S 1445.
1600 WHRI (Angel 2): UPI News. See S 0400.
1604 Jordan, Radio: The Mix. The latest pop music news and releases.
1605 WHRI (Angel 2): Our Foundation. See M 1605.
1606 WHRI (Angel 1): Music. See S 0000.
1610 Australia, Radio: Dateline. See M 0110.
1610 WHRI (Angel 2): Five Minutes to Victory. See M 1610.
1615 WHRI (Angel 2): Ever Increasing Faith. See M 1200.
1630 WHRI (Angel 2): The Voice of Power. See M 0230.
1645 WHRI (Angel 2): Reach Out. See M 1315.

Thursdays

1600 Australia, Radio: World News and Sport. See M 1600.
1600 Jordan, Radio: News Summary. See S 1400.
1600 KWHR (Hawaii): Music. See S 0000.
1600 WHRI (Angel 1): Bible Pathway. See S 1445.
1600 WHRI (Angel 2): UPI News. See S 0400.
1603 Jordan, Radio: Radio Jordan's Top 20. A hit parade of western pop music releases in Jordan.
1605 WHRI (Angel 2): Our Foundation. See M 1605.
1606 WHRI (Angel 1): Music. See S 0000.
1610 Australia, Radio: Dateline. See M 0110.
1610 WHRI (Angel 2): Five Minutes to Victory. See M 1610.
1615 WHRI (Angel 2): Ever Increasing Faith. See M 1200.
1630 WHRI (Angel 2): The Voice of Power. See M 0230.
1645 WHRI (Angel 2): Reach Out. See M 1315.

Fridays

1600 Australia, Radio: World News and Sport. See M 1600.
1600 Jordan, Radio: News Summary. See S 1400.
1600 WHRI (Angel 1): Bible Pathway. See S 1445.
1600 WHRI (Angel 2): UPI News. See S 0400.
1604 Jordan, Radio: Country Music. An hour of the best of country & western music.
1605 WHRI (Angel 2): Our Foundation. See M 1605.
1606 WHRI (Angel 1): Music. See S 0000.
1610 Australia, Radio: Dateline. See M 0110.
1610 WHRI (Angel 2): Five Minutes to Victory. See M 1610.
1615 WHRI (Angel 2): Ever Increasing Faith. See M 1200.
1630 WHRI (Angel 2): The Voice of Power. See M 0230.
1645 WHRI (Angel 2): Reach Out. See M 1315.

Saturdays

1600 Australia, Radio: World News. See S 0000.
1600 Jordan, Radio: News Bulletin. See S 1200.
1600 KWHR (Hawaii): Turn Your Radio On. See S 0300.
1600 WHRI (Angel 2): Home Schooling (live). See A 0100.
1610 Australia, Radio: Asia Focus. See S 2310.
1613 Jordan, Radio: Music. See S 1215.
1630 Australia, Radio: Background Report. See A 1230.
1630 Jordan, Radio: SINPOCON. Listener verification reports (SINPO) and letters are read on the air during the pop music CONcert.

FREQUENCIES

1700-1800	Australia, Radio	6060pa	6080pa	6090pa	9580pa
		9615as	9860pa	11660pa	11880pa
		12080pa			
1700-1800 vl	Australia, VL8A Alice Spg	2310do			
1700-1800 vl	Australia, VL8K Katherine	2485do			
1700-1800 vl	Australia, VL8T Tent Crk	2325do			
1700-1800 vl	Canada, CBC N Quebec Svc	9625do			
1700-1800	Canada, CFCX Montreal	6005do			
1700-1800	Canada, CFRX Toronto	6070do			
1700-1800	Canada, CFVP Calgary	6030do			
1700-1800	Canada, CHNX Halifax	6130do			
1700-1800	Canada, CKZN St John's	6160do			
1700-1800	Canada, CKZU Vancouver	6160do			
1700-1800	China, China Radio Intl	5220af	7150af	7405af	
1700-1730	China, China Radio Intl	6965af	7335af		
1700-1800 as	Costa Rica, Adv World R	13750am			
1700-1800	Costa Rica,RF Peace Intl	15050am			
1700-1727	Czech Rep, Radio Prague	5930eu	9430af		
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800	Eqt Guinea, Radio Africa	15186af			
1700-1730	France, Radio France Intl	9485af	11615af	12015me	
1700-1800 vl	Italy, IRRS	3985va			
1700-1800	Japan, R Japan/NHK World	6035na	7200na	7225na	9535na
		11880as	11905	15205me	
1700-1730	Jordan, Radio	11690eu			
1700-1752 mtwhf	New Zealand, R NZ Intl	6070pa			
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9975af	13785me
1700-1800 vl	Papua New Guinea, NBC	4890do			
1700-1800	Russia,Voice of Russia WS	4740me	4920eu	5940eu	6110eu
		6130eu	7115af	7130me	7175af
		7180eu	7210me	7255me	7275me
		7305af	7325af	7330eu	7440eu
		9505af	9550af	9585af	9890eu
		13670af			
1700-1755	S Africa, Channel Africa	7155af	9685af		
1700-1725	S Arica, Investment Ch	17735va			
1700-1730	Switzerland, Swiss R Intl	5850af	9885af	9905af	
1700-1800	Switzerland, Swiss R Intl	7410eu			
1700-1800	United Kingdom, BBC WS	3955eu	5975as	6090va	6180va
		6190af	6195eu	9410va	9510as
		9740as	11750as	11940af	12095eu
		15400af	15420af	15485eu	15575af
		17830af	17840af		
1700-1745	United Kingdom, BBC WS	3915as	7135as	9630af	11860af
1700-1800	USA, KAIJ Dallas TX	13815am			
1700-1800	USA, KTBN Salt Lk City UT	15590am			
1700-1800	USA, KVOH Los Angeles CA	17775na			
1700-1800	USA, KWHR Naalehu HI	6120as			
1700-1800	USA, Monitor Radio Intl	9355eu	9385af	18930af	
1700-1800	USA, Voice of America	6035af	6040eu	6110as	7125as
		7215as	9645as	9760me	11920eu
		12040af	13600eu	13710af	15205me
		15395as	15445af	15580af	17895eu
1700-1800 mtwhf	USA, Voice of America	5990as	6045as	9525as	9670as
		9770as	12005as	19795as	
1700-1800	USA, WEWN Birmingham AL	11875na	13615na	15665eu	
1700-1800	USA, WGTG McCaysville GA	9400am			
1700-1800	USA, WHRI Noblesville IN	13760am	15105am		
1700-1800	USA, WJCR Upton KY	7490na			
1700-1800 smtwhf	USA, WMLK Bethel PA	9465eu			
1700-1800	USA, WRNO New Orleans LA	7355am			
1700-1800	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1700-1800	USA, WYFR Okeechobee FL	15695eu	17555eu		
1700-1800	Zambia, Christian Voice	3330af			
1700-1800 a	Zambia, ZNBC Radio 2	6165do			
1700-1800 vl	Zimbabwe, Zimbabwe BC	4828do			
1715-1730	Albania, R Tirana Intl	6185eu	7155eu		
1730-1800	Guam, AWR/KSDA	9370as			
1730-1800	Netherlands, Radio	6020af	9605af	11655af	
1730-1800 vl	Philippines, R Pilipinas	11815me	11890me	15190me	
1730-1800	Romania, R Romania Intl	11740af	11940af	15340af	
1730-1800	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1730-1800	Swaziland, Trans World R	3200af			
1730-1800	Vatican State, Vatican R	9660af	11625af	15570af	
1745-1800	Bangladesh,Bangla Betar	7185as	9548eu	15520do	
1745-1800	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935af	13770as	13780do	15075me
1753-1800 mtwhf	New Zealand, R NZ Intl	9810pa			
1800-1900	Australia, Radio	9580pa	9860pa	11880pa	12080pa
1800-1830	Australia, Radio	6060pa	6080as		
1800-1900 vl	Australia, VL8A Alice Spg	2310do			
1800-1900 vl	Australia, VL8K Katherine	2485do			
1800-1900 vl	Australia, VL8T Tent Crk	2325do			
1800-1900	Bangladesh,Bangla Betar	7185eu	9548as	15520do	
1800-1900	Brazil, Radio Bras	15265eu			
1800-1900	Canada, CFCX Montreal	6005do			
1800-1900	Canada, CFRX Toronto	6070do			
1800-1900	Canada, CFVP Calgary	6030do			
1800-1900	Canada, CHNX Halifax	6130do			
1800-1900	Canada, CKZN St John's	6160do			
1800-1900	Canada, CKZU Vancouver	6160do			
1800-1900	Costa Rica,RF Peace Intl	15050am			
1800-1827	Czech Rep, Radio Prague	5835eu	9430af		
1800-1830	Egypt, Radio Cairo	15255af			
1800-1900	Eqt Guinea, Radio Africa	15186af			
1800-1830	Georgia, Radio	6080eu			
1800-1900	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935me	13770as	13780as	15075as
1800-1900 t	Ireland,W Coast R Ireland	11665af			
1800-1900	Kuwait, Radio	11990na			
1800-1900 s	Morocco, RTVM Marocaine	17815af			
1800-1825	Netherlands, Radio	6020af	9605af	11655af	
1800-1900 mtwhf	New Zealand, R NZ Intl	9810pa			
1800-1900 vl	Papua New Guinea, NBC	4890do			
1800-1900 vl	Philippines, R Pilipinas	11815me	11890me	15190me	
1800-1855	Poland, Polish R Warsaw	6000eu	6095eu	7270eu	7285eu
1800-1900	Russia,Voice of Russia WS	6130eu	7175af	7180eu	7305af
		7325af	7440eu	9505af	9890eu
		13670af			
1800-1825	S Africa, Investment Ch	9675af	17735af		
1800-1900	Sudan, Radio Omdurman	9200af			
1800-1900	Swaziland, Trans World R	3200af			
1800-1830	Swaziland, Trans World R	9500af			
1800-1900	United Kingdom, BBC WS	3255af	3955eu	6005eu	6180eu
		6190af	6195eu	9410va	12095eu
		15400af	15420af	15485va	17830af
1800-1830	United Kingdom, BBC WS	5975as	6090va	9510as	
1800-1900	USA, KAIJ Dallas TX	13815am			
1800-1900	USA, KJES Mesquite NM	15385na			
1800-1900	USA, KTBN Salt Lk City UT	15590am			
1800-1900	USA, KWHR Naalehu HI	13625au			
1800-1900	USA, Monitor Radio Intl	9355eu	9385af	11550eu	18930af
1800-1900	USA, Voice of America	6040va	9760me	11920af	12040af
		13710af	15410af	15580af	
1800-1900	USA, WEWN Birmingham AL	11875na	13615na	17695eu	
1800-1900	USA, WGTG McCaysville GA	9400am			
1800-1900	USA, WHRI Noblesville IN	9495am	13760eu		
1800-1900	USA, WJCR Upton KY	7490na			
1800-1900 smtwhf	USA, WMLK Bethel PA	9465eu			
1800-1900	USA, WRNO New Orleans LA	7355am			
1800-1900 mtwhf	USA, WVHA Greenbush ME	11580af			
1800-1900	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1800-1900	USA, WYFR Okeechobee FL	15695eu	17555eu		
1800-1845	USA, WYFR Okeechobee FL	15695eu			
1800-1830	Vietnam, Voice of	7400eu	9840eu		
1800-1900	Yemen, Yemeni Rep Radio	9780do			
1800-1900	Zambia, Christian Voice	3330af			
1800-1810	Zambia, ZNBC Radio 1	7220do			
1800-1857	Zambia, ZNBC Radio 2	6165do			
1800-1900 vl	Zimbabwe, Zimbabwe BC	4828do			
1830-1900	Australia, Radio	7240pa	7330as		
1830-1900	Netherlands, Radio	6020af	9605af	11655af	15315af
		17605af			
1830-1900	Philippines, FEBC/R Intl	9495as			
1830-1855	S Africa, Investment Ch	9675af	17735af		
1830-1835	Somalia, Radio Mogadishu	6732do			
1830-1900	South Korea, R Korea Intl	3970eu			
1830-1900	United Kingdom, BBC WS	9630af			
1833-1900	Cote D' Ivoire, RDTV	11920do			
1840-1850	Greece, Voice of	11645af	15150af		
1845-1900 mtwhf	Armenia, Voice of	4810me	4990eu	7480me	
1845-1900 irreg s	Mali, RDTV Malienne	4783do	4835do	5995do	
1850-1900 s	New Zealand, R NZ Intl	9810pa			
1858-1900 s	Germany, R Alpha & Omega	6110eu			

Hello, Writers...

Do you have a topic you've always "thought about" writing up for Monitoring Times? Now is the time! Given our full-spectrum coverage, plus the interest in new technology on the one hand and nostalgia for the past on the other, there is no limit to appropriate subject matter to write about. Bone up on your research, warm up your pen, and you, too, can earn a little spending money!

Pitch your idea to the editor at mteditor@grove.net or call 704-837-9200 and ask for Rachel. Writer's Guidelines are available on the MT homepage at www.grove.net, or for an SASE.

FREQUENCIES

1900-2000 m-f/vl	Argentina, RAE	15345eu			
1900-2000	Australia, Radio	6080pa	7240pa	7330as	9580pa
		9860pa	11880pa	12080pa	
1900-2000 vl	Australia, VL8A Alice Spg	2310do			
1900-2000 vl	Australia, VL8K Katherine	2485do			
1900-2000 vl	Australia, VL8T Tent Crk	2325do			
1900-1925 mtwhfs	Belgium, R Vlaanderen Int	5910eu	9925af		
1900-1920	Brazil, Radio Bras	15265eu			
1900-2000	Canada, CFCX Montreal	6005do			
1900-2000	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CKZN St John's	6160do			
1900-2000	Canada, CKZU Vancouver	6160do			
1900-2000	China, China Radio Intl	6955af	9440af		
1900-2000	Costa Rica, Adv World R	13750am	15460am		
1900-2000	Costa Rica,RF Peace Intl	15050am			
1900-1930	Cote D' Ivoire, RDTV	11920do			
1900-2000	Ecuador, HCJB	11960eu	21455am		
1900-2000	Eqt Guinea, Radio Africa	15186af			
1900-1950	Germany, Deutsche Welle	9640af	9765af	11785af	11810af
		13690af	15135af	15425af	
1900-2000 s	Germany, R Alpha & Omega	6110eu			
1900-1910	Greece, Voice of	9375eu			
1900-2000	Guatemala, Adv World R	5980am			
1900-1945	India, All India Radio	7410eu	9650eu	9950me	11620eu
		11935af	13770as	13780as	15075as
1900-2000 vl	Italy, IRRS	3985va			
1900-2000	Japan, R Japan/NHK World	6035as	7140pa	7200as	9535na
1900-2000 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
1900-2000	Kuwait, Radio	11990eu			
1900-1915	Liberia,LCN/R Liberia Int	5100do			
1900-2000 smtwha	Malta, VO Mediterranean	7390va	7440va		
1900-2000	Netherlands, Radio	6020af	9605af	11655af	15315af
1900-1952 mtwhfa	New Zealand, R NZ Intl	9810pa			
1900-1958 a	New Zealand, R NZ Intl	9810pa			
1900-1930 s	Norway, Radio Norway Intl	5960eu	7485af	9590af	
1900-2000 vl	Papua New Guinea, NBC	4890do			
1900-1930 vl	Philippines, R Pilipinas	11815me	11890me	15190me	
1900-2000	Romania, R Romania Intl	5955eu	7105af	7195eu	9690eu
1900-2000	Russia,Voice of Russia WS	4920eu	5940eu	6110eu	6130eu
		7180eu	7210af	7255af	7275af
		7305af	7325af	7440eu	9505af
		9585af	9890eu		
1900-1925	S Africa, Investment Ch	9675af	15420af	17890af	
1900-2000	South Korea, R Korea Intl	5975eu	7275as		
1900-2000	Swaziland, Trans World R	3200af			
1900-2000	Thailand, Radio	7295eu	9655eu	11905eu	
1900-2000	United Kingdom, BBC WS	3255af	3955eu	6005af	6180eu
		6190af	6195va	9410af	9630af
		9740as	12095eu	15400af	15485va
		17830af			
1900-1915	United Kingdom, BBC WS	11835af			
1900-2000	USA, KAIJ Dallas TX	13815am			
1900-2000	USA, KTBN Salt Lk City UT	15590am			
1900-2000	USA, KWHR Naalehu HI	13625au			
1900-2000	USA, Monitor Radio Intl	9355eu	9385af	11550eu	17510af
1900-2000	USA, Voice of America	4950af	6035af	7415af	9525pa
		9760me	11870pa	11920af	11975va
		12040af	13710af	15180pa	15410af
		15580af			
1900-2000	USA, WEWN Birmingham AL	11875na	13615na	17695eu	
1900-2000	USA, WGTG McCaysville GA	9400am			
1900-2000	USA, WHRI Noblesville IN	9495am	13760eu		
1900-2000	USA, WJCR Upton KY	7490na			
1900-2000 smtwhf	USA, WMLK Bethel PA	9465eu			
1900-2000	USA, WRNO New Orleans LA	7355am			
1900-2000 smtwhf	USA, WVHA Greenbush ME	9930af			
1900-2000	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1900-1945	USA, WYFR Okeechobee FL	17555eu			
1900-1930	Vietnam, Voice of	7400eu	9840eu		
1900-2000	Zambia, Christian Voice	3330af			
1900-2000 vl	Zimbabwe, Zimbabwe BC	4828do			
1903-2010 as	Croatia, Croatian Radio	5895eu	5920eu	7165eu	9830eu
		11635eu	11830eu	13830eu	
1930-2000	Albania, R Tirana Intl	6270eu	7270eu	9740eu	
1930-1955	Austria, R Austria Intl	5945eu	6155eu	9495af	
1930-2000 t	Belarus, Radiosta Belarus	6010eu	7105eu	7205eu	7210eu
1930-2000	Iran, VOIRI	7260af	9022eu		
1930-2000	Mongolia, Voice of	9745eu	12085eu		
1930-1955	S Africa, Investment Ch	9675af	15420af	17890af	
1930-2000	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1930-2000	South Korea, R Korea Intl	3970eu			
1930-2000	Sweden, Radio	6065eu	7240eu	9655af	
1930-2000	Turkey, Voice of	6000na	6035na		
1930-2000 a	Yugoslavia, Radio	6100eu	9720af		
1935-1955	Italy, RAI Intl	6030eu	7235eu		
1950-2000	Vatican State, Vatican R	4005eu	5880eu	7250eu	
1953-2000 smtwhf	New Zealand, R NZ Intl	11735pa			
1959-2000 a	New Zealand, R NZ Intl	11735pa			

2000-2100	Angola, Radio Nacional	3355do	9535do		
2000-2100	Australia, Radio	6080pa	7240pa	7330as	9580pa
		9860pa	11880pa	12080pa	
2000-2100 vl	Australia, VL8A Alice Spg	2310do			
2000-2100 vl	Australia, VL8K Katherine	2485do			
2000-2100 vl	Australia, VL8T Tent Crk	2325do			
2000-2100	Bulgaria, Radio	7335eu	9700eu		
2000-2100	Canada, CFCX Montreal	6005do			
2000-2100	Canada, CFRX Toronto	6070do			
2000-2100	Canada, CFVP Calgary	6030do			
2000-2100	Canada, CHNX Halifax	6130do			
2000-2100	Canada, CKZN St John's	6160do			
2000-2100	Canada, CKZU Vancouver	6160do			
2000-2100	China, China Radio Intl	5220eu	6950eu	9440af	9920eu
		11715af	15110af		
2000-2100	Costa Rica,RF Peace Intl	15050am			
2000-2027	Czech Rep, Radio Prague	5930eu	7345af		
2000-2100	Ecuador, HCJB	11960eu	21455am		
2000-2100	Eqt Guinea, Radio Africa	15186af			
2000-2030 m	Estonia, Radio	5925eu			
2000-2050	Germany, Deutsche Welle	5960eu	7285eu	9615eu	9670pa
2000-2030	Ghana, Ghana Broadc Corp	3366do	4915do		
2000-2100	Guatemala, Adv World R	5980am			
2000-2030	Hungary, Radio Budapest	3975eu	5970eu	9835eu	
2000-2100	Indonesia, Voice of	9525as			
2000-2030	Iran, VOIRI	7260af	9022eu		
2000-2025	Israel, Kol Israel	7465na	9365eu	9435na	15640af
2000-2100 vl	Italy, IRRS	3985va			
2000-2100 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2000-2100	Kuwait, Radio	11990eu			
2000-2030 as	Latvia, Radio	5935eu			
2000-2030	Mexico, Radio Mexico Intl	9705na			
2000-2025	Netherlands, Radio	6020af	9605af	11655af	15315af
2000-2006 fa	New Zealand, R NZ Intl	9875pa			
2000-2100 mtwhf	New Zealand, R NZ Intl	11735pa			
2000-2005	Nigeria, FRCN/Radio	3326do	4770do	4990do	
2000-2050	North Korea, R Pyongyang	6575eu	9345as	9640af	9975as
2000-2100 vl	Papua New Guinea, NBC	4890do			
2000-2100	Russia,Voice of Russia WS	4920eu	5940eu	6110eu	6130eu
		7175af	7180eu	7305af	7325af
		9585af	9890eu	13670af	
2000-2025	S Africa, Investment Ch	7270af	15420af	17890af	
2000-2015	Sierra Leone, SLBS	3316do			
2000-2015 irreg	Somalia, Radio Mogadishu	6870af			
2000-2100 mtwhf	Spain, R Exterior Espana	6125eu	11775af		
2000-2045	Swaziland, Trans World R	3200af			
2000-2030	Switzerland, Swiss R Intl	9885af	9905af	11640af	13635af
2000-2020	Switzerland, Swiss R Intl	6165eu			
2000-2030	Turkey, Voice of	6000na	6035na		
2000-2015	Uganda, Radio	3340do			
2000-2100	United Kingdom, BBC WS	3255af	3955eu	6005af	6180eu
		6190af	6195eu	7150va	7325va
		9410af	9630af	9740as	11750am
		11835af	11955as	12095eu	15400af
		17830af			
2000-2100	USA, KAIJ Dallas TX	13815am			
2000-2100	USA, KTBN Salt Lk City UT	15590am			
2000-2100	USA, KWHR Naalehu HI	11815as			
2000-2100	USA, Monitor Radio Intl	5835eu	7510eu	13840pa	
2000-2100	USA, Voice of America	6035af	7415af	9760me	11855af
		11975af	13710af	15205me	15410af
		15580af	17725af	17755af	
2000-2100	USA, WEWN Birmingham AL	7425na	13615na	17695eu	
2000-2100	USA, WGTG McCaysville GA	9400am			
2000-2100	USA, WHRI Noblesville IN	9495am	13760eu		
2000-2100	USA, WJCR Upton KY	7490na			
2000-2100 smtwhf	USA, WMLK Bethel PA	9465eu			
2000-2100 s	USA, WRMI/R Miami Intl	9955am			
2000-2100	USA, WRNO New Orleans LA	7355am			
2000-2100 mtwhfa	USA, WVHA Greenbush ME	9930va			
2000-2100	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2000-2100	USA, WYFR Okeechobee FL	5810eu	7355af	15566af	
2000-2045	USA, WYFR Okeechobee FL	21525af			
2000-2030	Vatican State, Vatican R	7365eu	9645eu		
2000-2100	Zambia, Christian Voice	3330af			
2000-2005	Zambia, ZNBC Radio 2	6165do			
2000-2100 vl	Zimbabwe, Zimbabwe BC	4828do			
2005-2100	Syria, Radio Damascus	12085na	13610eu		
2007-2100 fa	New Zealand, R NZ Intl	11735pa			
2025-2045	Italy, RAI Intl	7105af	9685af	11840af	
2030-2100	Egypt, Radio Cairo	15375af			
2030-2100	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
2030-2055	S Africa, Investment Ch	7270af	17890af		
2030-2100	Slovakia, Adv World Radio	9455af			
2030-2100	Sweden, Radio	6065eu			
2030-2045	Thailand, Radio	9655eu	11805as	11905eu	
2030-2100 as	USA, Voice of America	4950eu			
2030-2100	Uzbekistan, R Tashkent	4850eu	5995eu	7105eu	9540eu
		11905eu			
2030-2100	Vietnam, Voice of	5940eu	7270eu	7400eu	9840eu
		12020eu	15010eu		
2045-2100	India, All India Radio	7150eu	7410eu	9910au	9950eu
		11620eu	11715pa		

Frequencies

2100-2200	Australia, Radio	7240pa	9660pa	9850pa	9860as
		11640as	11695pa	11855as	11880pa
		12080pa	13605pa		
2100-2130	Australia, Radio	6080pa	11800pa		
2100-2130 vl	Australia, VL8A Alice Spg	2310do			
2100-2130 vl	Australia, VL8K Katherine	2485do			
2100-2200 vl	Australia, VL8K Katherine	5025do			
2100-2130 vl	Australia, VL8T Tent Crk	2325do			
2100-2200 vl	Australia, VL8T Tent Crk	4910do			
2100-2200 vl	Cameroon, Radio Garoua	5010do			
2100-2200 vl	Canada, CBC N Quebec Svc	9625do			
2100-2200	Canada, CFCX Montreal	6005do			
2100-2200	Canada, CFRX Toronto	6070do			
2100-2200	Canada, CFVP Calgary	6030do			
2100-2200	Canada, CHNX Halifax	6130do			
2100-2200	Canada, CKZN St John's	6160do			
2100-2200	Canada, CKZU Vancouver	6160do			
2100-2200	Canada, R Canada Intl	5925eu	5995eu	7235eu	9805af
		11945af	13650af	13690af	15150af
2100-2200	China, China Radio Intl	5220eu	6950eu	9920af	
2100-2130	China, China Radio Intl	11715af	15110af		
2100-2200	Costa Rica,RF Peace Intl	15050am			
2100-2200	Cuba, Radio Havana	9585eu	9620eu		
2100-2200	Ecuador, HCJB	11960eu	21455am		
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15186af			
2100-2150	Germany, Deutsche Welle	9615af	9670as	9765as	11785pa
		11865af	15275af		
2100-2200	India, All India Radio	7150eu	7410eu	9910eu	9950eu
		11620au	11715au		
2100-2200 vl	Italy, IRRS	3955va			
2100-2200	Japan, R Japan/NHK World	6035as	9560as	9825as	11850pa
2100-2110	Japan, R Japan/NHK World	9860as	11685as		
2100-2107 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2100-2200	Lebanon, Voice of Hope	9960va			
2100-2115	Liberia,LCN/R Liberia Int	5100do			
2100-2130	Mexico, Radio Mexico Intl	9705na			
2100-2135 smtwh	New Zealand, R NZ Intl	11735pa			
2100-2200 fa	New Zealand, R NZ Intl	11735pa			
2100-2200	Nigeria, FRCN/Radio	3326do	4770do	4990do	
2100-2200 vl	Papua New Guinea, NBC	4890do			
2100-2125	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
2100-2130 mtwhf	Portugal, R Portugal Intl	6130eu	9780eu	9815eu	
2100-2200	Romania, R Romania Intl	5955eu	5990eu	7105eu	7195eu
2100-2200	Russia,Voice of Russia WS	5940eu	6110eu	7170eu	7180eu
		7320eu	7440eu	9890eu	
2100-2125	S Africa, Investment Ch	15420af	17890af		
2100-2200	Slovakia, Adv World Radio	6055eu			
2100-2200	South Korea, R Korea Intl	6480eu	15575eu		
2100-2110	Uganda, Radio	3340do			
2100-2200	United Kingdom, BBC WS	3255af	3915as	3955eu	5965as
		5975am	6005af	6120as	6180eu
		6190af	6195va	7150va	7325eu
		9410va	9740as	11680va	11750sa
		11835af	11955as	12095va	
2100-2130	United Kingdom, BBC WS	9630af			
2100-2200	USA, KAIJ Dallas TX	13815am			
2100-2200	USA, KTBN Salt Lk City UT	15590am			
2100-2200	USA, KWHR Naalehu HI	11815as			
2100-2200	USA, Monitor Radio Intl	5835eu	7510eu	13840au	
2100-2200	USA, Voice of America	6035af	6070me	7415af	9595me
		9760me	11975af	13710eu	15205me
		15410eu	15580eu	17725eu	
2100-2200	USA, WEWN Birmingham AL	7425na	13615na	17695eu	
2100-2200	USA, WGTG McCaysville GA	9400am			
2100-2200	USA, WHRI Noblesville IN	9495am	13760am		
2100-2200	USA, WJCR Upton KY	7490na			
2100-2200 smtwhf	USA, WMLK Bethel PA	9465eu			
2100-2200 a	USA, WRMI/R Miami Intl	9955am			
2100-2130 s	USA, WRMI/R Miami Intl	9955am			
2100-2200	USA, WRNO New Orleans LA	7355am			
2100-2200 mtwhfa	USA, WVHA Greenbush ME	9930va			
2100-2200	USA, WWCR Nashville TN	7435am	9475am	12160am	13845am
2100-2200	USA, WYFR Okeechobee FL	7355eu	11580eu	15565eu	
2100-2105	Zambia, ZNBC Radio 2	6165do			
2100-2200 vl	Zimbabwe, Zimbabwe BC	4828do			
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130	United Kingdom, BBC WS	11680am	15390am	17715am	
2130-2200	Armenia, Voice of	7480eu	9965eu	11615eu	
2130-2200	Australia, Radio	13755pa	17795pa	17860pa	
2130-2200	Finland, YLE/R Finland	6135eu			
2130-2200	Guam, AWR/KSDA	15310as			
2130-2200	Iran, VOIRI	6175au			
2130-2135 mtwhf	Latvia, Radio	5935eu			
2130-2155	S Africa, Investment Ch	15420af	17890af		
2130-2200 as	Sweden, Radio	6065eu	7230af		
2130-2200	Uzbekistan, R Tashkent	4850eu	5995eu	7105eu	9540eu
		11905eu			
2136-2200 smtwh	New Zealand, R NZ Intl	15115pa			
2145-2200 a	Greece, Voice of	9425au			

2200 UTC

2200-2300	Australia, Radio	11695pa	11855as	12080pa	13755pa
		15365pa	17795pa	17860pa	
2200-2300 vl	Australia, VL8K Katherine	5025do			
2200-2300 vl	Australia, VL8T Tent Crk	4910do			
2200-2225	Belgium, R Vlaanderen Int	5910eu			
2200-2300	Bulgaria, Radio	7390eu	9700eu		
2200-2300	Canada, CBC N Quebec Svc	9625do			
2200-2300	Canada, CFCX Montreal	6005do			
2200-2300	Canada, CFRX Toronto	6070do			
2200-2300	Canada, CFVP Calgary	6030do			
2200-2300	Canada, CHNX Halifax	6130do			
2200-2300	Canada, CKZN St John's	6160do			
2200-2300	Canada, CKZU Vancouver	6160do			
2200-2230	Canada, R Canada Intl	5995eu	7235eu	9805af	11705eu
		11945af	13690eu	15150eu	
2200-2300	China, China Radio Intl	7110eu	7170eu		
2200-2230	China, China Radio Intl	3985eu			
2200-2300	Costa Rica,RF Peace Intl	7385am	15050am		
2200-2300	Cuba, Radio Havana	6180na			
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300	Eqt Guinea, Radio Africa	15186af			
2200-2215	Ghana, Ghana Broadc Corp	4915do			
2200-2230	Hungary, Radio Budapest	3975eu	5970eu	7250eu	9835eu
2200-2230	India, All India Radio	7150eu	7410eu	9910eu	9950eu
		11620au	11715au		
2200-2230	Iran, VOIRI	6175au			
2200-2300 vl	Italy, IRRS	3955va			
2200-2225	Italy, RAI Intl	6150as	9565as	11815pa	
2200-2300	Lebanon, Voice of Hope	9960va			
2200-2215	Liberia,LCN/R Liberia Int	5100do			
2200-2300	Malaysia, Radio	7295do			
2200-2225 mtwhf	Moldova, R Moldova Intl	7520eu			
2200-2300 smtwh	New Zealand, R NZ Intl	15115pa			
2200-2215	Nigeria, FRCN/Radio	3326do	4770do	4990do	
2200-2208 vl	Papua New Guinea, NBC	4890do			
2200-2300	Russia,Voice of Russia WS	5940eu	6110eu	7180eu	7205eu
		7320eu	7360eu	7400eu	9890eu
2200-2215	Sierra Leone, SLBS	3316do			
2200-2300	Slovakia, Adv World Radio	6055af			
2200-2300 as	Spain, R Exterior Espana	6125eu	11775af		
2200-2205	Syria, Radio Damascus	12085na	13610eu		
2200-2300	Taiwan, VO Free China	5810eu	9985eu		
2200-2300	Ukraine, R Ukraine Intl	5905eu	6010eu	6020eu	6080eu
		7115eu	7160eu	7205eu	7290eu
		7380eu			
2200-2300	United Kingdom, BBC WS	3955eu	5905as	5975am	6175am
		6180va	6195as	7110as	7150as
		7325va	9410va	9590am	9660as
		9915am	11750am	11835af	11955as
		12080as			
2200-2300	USA, KAIJ Dallas TX	13815am			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, Monitor Radio Intl	7510eu	13770sa	13840as	
2200-2300	USA, Voice of America	7215as	9770as	9890as	11760as
		15185as	15290as	15305as	17735as
		17820as			
2200-2230 mtwhf	USA, Voice of America	6035af	7415af	11975af	12080af
		13710af			
2200-2300	USA, WEWN Birmingham AL	7395na	11820eu	13615na	
2200-2300	USA, WGTG McCaysville GA	9400am			
2200-2300	USA, WHRI Noblesville IN	9495am			
2200-2300	USA, WJCR Upton KY	7490na			
2200-2300 a	USA, WRMI/R Miami Intl	9955am			
2200-2300	USA, WRNO New Orleans LA	7355am			
2200-2300 smtwhf	USA, WVHA Greenbush ME	5850af			
2200-2300	USA, WWCR Nashville TN	5070am	7435am	9475am	13845am
2200-2245	USA, WYFR Okeechobee FL	11580af	15565af	21525eu	
2200-2230	Yugoslavia, Radio	6100eu	6185eu		
2200-2210	Zambia, ZNBC Radio 2	6165do			
2207-2300 fa	New Zealand, R NZ Intl	15115pa			
2210-2300 vl	Papua New Guinea, NBC	9675do			
2230-2255	Austria, R Austria Intl	5945eu	6155eu	9495af	
2230-2257	Czech Rep, Radio Prague	5930na	7345na		
2230-2300	Sweden, Radio	6065eu	7325af		
2230-2300 mtwhf	USA, WRMI/R Miami Intl	9955am			
2240-2250	Greece, Voice of	9425au			
2245-2300	Ghana, Ghana Broadc Corp	3366do	4915do		
2245-2300	India, All India Radio	7170as	9705as	9950as	11620as
2245-2300	Vatican State, Vatican R	6065as	7305as	9600as	11830au

Frequencies

2300-0000	Australia, Radio	9660pa	11695as	11855as	13755as
		15365pa	17795pa	17860pa	
2300-0000 vl	Australia, VL8K Katherine	5025do			
2300-0000 vl	Australia, VL8T Tent Crk	4910do			
2300-0000	Canada, CBC N Quebec Svc	9625do			
2300-0000	Canada, CFCX Montreal	6005do			
2300-0000	Canada, CFRX Toronto	6070do			
2300-0000	Canada, CFVP Calgary	6030do			
2300-0000	Canada, CHNX Halifax	6130do			
2300-0000	Canada, CKZN St John's	6160do			
2300-0000	Canada, CKZU Vancouver	6160do			
2300-2330	Canada, R Canada Intl	5960am	6040am	9535am	9755am
		11940am			
2300-0000	Costa Rica, Adv World R	5030am	6150am	7375am	9725am
		13750am	15460am		
2300-0000	Costa Rica,RF Peace Intl	7385am	15050am		
2300-0000	Egypt, Radio Cairo	9900na			
2300-2350	Germany, Deutsche Welle	6000as	6160as	7235as	
2300-0000	Guam, AWR/KSDA	11775as			
2300-0000	Guatemala, Adv World R	11775am			
2300-0000	India, All India Radio	7170as	9705as	9950as	11620as
2300-0000	Japan, R Japan/NHK World	6180eu	9560as	9825eu	11850pa
2300-0000	Lebanon, Voice of Hope	9960va			
2300-2315	Liberia,LCN/R Liberia Int	5100do			
2300-0000	Malaysia, Radio	7295do			
2300-2325 mtwhf	Moldova, R Moldova Intl	7520na			
2300-0000 as	New Zealand, R NZ Intl	15115pa			
2300-2315	Nigeria, FRCN/Radio	3326do	4770do	4990do	
2300-2350	North Korea, R Pyongyang	11700na	13650na		
2300-2330 s	Norway, Radio Norway Intl	5905sa	7275as	7465na	
2300-0000 vl	Papua New Guinea, NBC	9675do			
2300-0000	Romania, R Romania Intl	7175na	9510na	9570na	11940na
2300-0000	Russia,Voice of Russia WS	5940na	7105na	7125na	7170na
		7180na	7330na		
2300-0000	Turkey, Voice of	6135na	7280na	9560na	9655na
2300-0000	United Kingdom, BBC WS	5965as	5975am	6175am	6195am
		7110as	7180as	9580as	9590na
		9915am	11750sa	11945as	11955as
2300-2330 a	United Kingdom, BBC WS	11835af			
2300-2345	United Kingdom, BBC WS	3915va			
2300-0000	USA, KAIJ Dallas TX	13815am			
2300-0000	USA, KTBN Salt Lk City UT	15590am			
2300-0000	USA, KWHR Naalehu HI	17510as			
2300-0000	USA, Monitor Radio Intl	7510af	13770sa		
2300-0000	USA, Voice of America	7215as	9770as	9890as	11760as
		15185as	15290as	15305as	17735as
		17820as			
2300-0000	USA, WEWN Birmingham AL	6890na	13615na		
2300-0000	USA, WGTG McCaysville GA	5085am			
2300-0000	USA, WHRI Noblesville IN	5745am			
2300-0000	USA, WJCR Upton KY	7490na			
2300-0000 mtwhf	USA, WRMI/R Miami Intl	9955am			
2300-0000	USA, WRNO New Orleans LA	7355am			
2300-0000 s	USA, WVHA Greenbush ME	5850eu			
2300-0000	USA, WWCR Nashville TN	3215am	5070am	7435am	13845am
2300-2315	Vatican State, Vatican R	7305as	9600as	11830na	
2303-2310 as	Croatia, Croatian Radio	5895eu	5920eu	7165eu	9830eu
		11635eu	11830eu	13830eu	
2330-0000 as	Canada, R Canada Intl	5960am	6010am	9535am	9755am
		11940am			
2330-0000	Canada, R Canada Intl	5960na	9755na		
2330-0000 vl	Ghana, Ghana Broadc Corp	4915af			
2330-0000	Iraq, Radio Iraq Intl	6050eu	11890eu		
2330-2359	Netherlands, Radio	6020na	6165na		
2330-0000	Vietnam, Voice of	5940as	7270as	7400as	9840as
		12020as	15010as		
2335-2345	Greece, Voice of	7448sa	9935sa	11640sa	
2355-0000	Japan, R Japan/NHK World	9860as	11685au		

Selected Programs

Sundays

2300 Australia, Radio: World News. See S 0000.
2300 WHRI (Angel 2): DXing with Cumbre. See S 0430.
2310 Australia, Radio: Asia Focus. Reporting on the commercial interrelationships of the Asia/Pacific Region.
2330 Australia, Radio: News Headlines. a one-minute wrap-up of current news.
2330 WHRI (Angel 2): Universal Life. The radio program of the original Christians in universal life.
2331 Australia, Radio: The Sports Factor. See S 1430.

Mondays

2300 Australia, Radio: World and Australian News and Sport. See M 0500.
2300 KWHR (Hawaii): The Prophecy Club. See S 0000.
2300 WHRI (Angel 2): The Prophecy Club. See S 0000.
2310 Australia, Radio: Asia Focus. See S 2310.
2330 Australia, Radio: News Headlines. See S 2330.
2330 WHRI (Angel 2): Music. See S 0000.
2331 Australia, Radio: Australia Today. See S 1130.
2345 KWHR (Hawaii): Reach Out. See M 1315.

Tuesdays

2300 Australia, Radio: World and Australian News and Sport. See M 0500.
2300 KWHR (Hawaii): The Prophecy Club. See S 0000.
2300 WHRI (Angel 2): The Prophecy Club. See S 0000.
2310 Australia, Radio: Asia Focus. See S 2310.
2330 Australia, Radio: News Headlines. See S 2330.
2330 WHRI (Angel 2): Music. See S 0000.
2331 Australia, Radio: Australia Today. See S 1130.
2345 KWHR (Hawaii): Reach Out. See M 1315.

Wednesdays

2300 Australia, Radio: World and Australian News and Sport. See M 0500.
2300 KWHR (Hawaii): The Prophecy Club. See S 0000.
2300 WHRI (Angel 2): The Prophecy Club. See S 0000.
2310 Australia, Radio: Asia Focus. See S 2310.
2330 Australia, Radio: News Headlines. See S 2330.
2330 WHRI (Angel 2): Music. See S 0000.
2331 Australia, Radio: Australia Today. See S 1130.
2345 KWHR (Hawaii): Reach Out. See M 1315.

Thursdays

2300 Australia, Radio: World and Australian News and Sport. See M 0500.
2300 KWHR (Hawaii): The Prophecy Club. See S 0000.
2300 WHRI (Angel 2): The Prophecy Club. See S 0000.
2310 Australia, Radio: Asia Focus. See S 2310.
2330 Australia, Radio: News Headlines. See S 2330.
2330 WHRI (Angel 2): Music. See S 0000.
2331 Australia, Radio: Australia Today. See S 1130.
2345 KWHR (Hawaii): Reach Out. See M 1315.

Fridays

2300 Australia, Radio: World News. See S 0000.
2300 KWHR (Hawaii): The Prophecy Club. See S 0000.
2300 WHRI (Angel 2): The Prophecy Club. See S 0000.
2310 Australia, Radio: Asia Focus. See S 2310.
2330 Australia, Radio: Australia Today. See S 1130.
2330 WHRI (Angel 2): DXing with Cumbre. See S 0430.
2345 KWHR (Hawaii): Reach Out. See M 1315.
2354 Radio Netherlands: Documentary. Andorra: The Mini State (14th). See A 2354.
2354 Radio Netherlands: Documentary. From the Wireless to the World Wide Web: Part 2 (7th). See W 1254.
2354 Radio Netherlands: Documentary. The Eleventh Insight (21th). See F 1454.
2354 Radio Netherlands: Documentary. The Marshall Plan (28th). Marijke van der Meer analyzes the achievements and legacies of this World War II European Recovery Plan.

Saturdays

2300 Australia, Radio: World News. See S 0000.
2300 WHRI (Angel 2): Biblical Studies Institute. See S 0400.
2310 Australia, Radio: The Science Show. Robyn Williams presents the world of science, both at home and abroad.
2330 Australia, Radio: Australia All Over. Join listeners across the island continent as Ian McNamara throws the spotlight on life in Australia.
2330 WHRI (Angel 1): DXing with Cumbre. See S 0430.
2330 WHRI (Angel 2): Prophetic Voice Broadcast. See S 0000.

MT Monitoring Team

Next Reporting Deadline: March 20, 1997

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THANK YOU ...

Additional contributors to this month's Shortwave Guide:

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PROPAGATION MODES

By Jacques d'Avignon

When we think of radio wave propagation, the first mode that comes to a shortwave listener's mind, is what is known as the **"ionospheric mode."** The short waves, 3 to 30 MHz, normally are propagated by refraction by the "D," "E," or "F" layers of the ionosphere, depending on the time of day. But there are other modes as well, and I will briefly discuss them this month.

Free-space propagation is the mode by which signals using VHF/UHF and above travel. This mode does not rely on any means of refraction or reflection to reach the receive destination. Matter of fact, if a broadcast FM signal is reflected by a building before reaching your receiver, you may encounter either complete cancellation of the signal or an enhancement. These signals are most happy following the "line of sight" between the transmitting antenna and the receiver.

However, the same waves that find it natural to go directly from the transmitter to the receiver, will occasionally find themselves trapped in an **atmospheric duct** and are carried much further than normal. An atmospheric duct will form when the normal temperature gradient is disturbed, and instead of having colder air as you go up in altitude, you get warmer air. This is called a temperature inversion, and it will result in the formation of a "duct" (like a heating duct or pipe), in which the radio waves are bounced up and down until they can escape. Wherever the ducts stops—often many miles away—the waves fall out of the "pipe"!

This is what causes a small handheld amateur transceiver, operating on 144 MHz with 3 watts, to reach across Lake Ontario from Rochester, New York, and trigger a repeater in the Kingston area of Ontario. This type of propagation normally happens in the fall and early winter months in our area.

Another method of transmission is the **"ground wave"** mode. This mode normally carries mediumwave broadcasting signals, low frequency beacon transmissions, and other, more unique signals. This is a brute force method, as it is necessary to transmit at very high power to overcome the attenuation of radio waves at ground level. In the tropics, this method of broadcasting is totally ineffective, as the vegetation absorbs all the signals at ground level. In this instance the ionospheric propagation mode called NVIS (**Near Vertical Incidence Skywave**) is used with great success. NVIS propagation will be discussed at a later date.

Early in November, Kevin Carey (*MT*'s "Below 500 kHz" columnist) and I attended a DX camp, and we heard the following stations on LF: Bechar in Algeria on 153 kHz; Allouis, France, on 162 kHz; and Kilmessan in Ireland on 252 kHz. The power of these stations runs between 100 and 2000 kW! Yes, that is .1 to 2 megawatts! These intercepts were made with a Sony 2010 fed by the now famous "Magic Wand" antenna and a Q-STICK Plus (see *MT* April 1996, page 15 for a description of the homebrew Magic Wand). Were these transmissions heard via ground wave or via an ionospheric mode? You decide!

The sunspot numbers are going up! Good DX.

OPTIMUM WORKING FREQUENCIES (MHz)

For the Period 15 March to 14 April 1997 Flux=81 SSN=19

UTC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
TO/FROM US WEST COAST																								
SOUTH AMERICA	21	19	17	14	12	11	11	11	11	9	7	9	10	12	16	18	18	18	19	20	21	22	23	22
WESTERN EUROPE	9	8	8	7	7	7	7	8	8	0	0	0	0	0	12	13	15	15	15	15	14	13	12	10
EASTERN EUROPE (P)	0	0	8	8	10	10	0	0	0	0	0	0	0	0	11	13	14	14	13	11	0	0	0	0
MEDITERRANEAN	11	11	11	12	11	10	10	0	0	0	0	0	0	0	13	15	16	16	17	16	15	13	0	12
MIDDLE EAST (P)	0	11	12	13	12	0	0	0	0	0	0	0	0	0	11	13	15	15	13	0	0	0	0	0
CENTRAL AFRICA	17	15	13	11	9	9	10	0	0	0	0	0	0	0	15	16	17	18	18	19	18	18	18	18
SOUTH AFRICA	11	11	11	10	9	9	10	10	0	0	0	0	0	0	16	17	17	18	19	15	0	0	0	0
SOUTH EAST ASIA (P)	18	18	18	16	14	0	0	0	0	0	0	9	10	10	10	12	13	14	14	14	0	0	0	15
FAR EAST	17	17	17	15	14	12	10	10	9	9	9	9	9	9	9	10	11	11	10	0	13	16	17	17
AUSTRALIA	22	22	22	21	17	14	12	11	11	11	11	11	11	10	10	13	13	12	0	0	14	19	21	22
TO/FROM US MIDWEST																								
SOUTH AMERICA	18	16	13	11	10	10	10	10	10	8	6	9	10	14	16	17	17	18	19	19	20	21	20	20
WESTERN EUROPE	10	9	9	8	8	8	8	8	8	0	0	0	11	14	15	16	16	16	16	16	16	15	14	12
EASTERN EUROPE	0	7	7	8	9	9	0	0	0	0	0	0	0	12	13	14	14	14	13	12	0	0	0	0
MEDITERRANEAN	11	11	11	11	10	9	9	0	0	0	0	0	0	14	15	16	16	17	17	16	14	12	11	11
MIDDLE EAST (P)	11	11	11	11	0	0	0	0	0	0	0	0	0	12	14	15	17	15	14	0	0	0	0	11
CENTRAL AFRICA	16	15	12	10	9	9	10	0	0	0	0	0	0	15	16	17	18	19	19	19	18	18	18	18
SOUTH AFRICA	11	11	11	10	9	9	10	0	0	0	0	0	0	16	17	17	18	19	19	15	0	0	12	11
SOUTH EAST ASIA (P)	16	16	15	0	0	0	0	0	0	0	0	9	9	10	12	13	13	13	13	13	0	0	0	14
FAR EAST	17	16	15	14	12	11	10	9	9	9	9	9	9	9	11	11	11	11	11	0	13	16	17	17
AUSTRALIA	21	21	19	16	13	0	11	11	11	11	11	11	10	10	13	13	13	0	0	0	15	19	21	22
TO/FROM US EAST COAST																								
SOUTH AMERICA	14	12	10	9	9	9	9	9	8	6	6	9	13	15	16	16	16	17	18	19	19	19	18	16
WESTERN EUROPE	9	8	8	8	8	8	7	7	7	0	0	11	13	15	16	16	16	16	16	16	15	14	12	10
EASTERN EUROPE	8	8	8	8	8	8	0	0	0	0	0	10	13	14	15	16	16	15	14	13	11	9	9	8
MEDITERRANEAN	11	10	11	10	9	8	8	0	0	0	0	12	14	15	16	16	16	17	17	16	13	11	11	11
MIDDLE EAST (P)	11	11	11	10	0	0	0	0	0	0	0	12	14	15	16	17	17	16	15	13	12	12	11	11
CENTRAL AFRICA	15	13	12	11	10	10	11	10	0	0	0	16	18	18	19	19	19	20	20	21	20	20	19	17
SOUTH AFRICA	11	11	11	10	9	9	11	11	0	0	0	15	18	18	18	19	19	20	19	15	12	11	12	11
SOUTH EAST ASIA (P)	14	13	0	0	0	0	0	0	0	0	0	10	12	14	14	12	0	0	0	13	0	0	0	12
FAR EAST	15	14	13	0	0	0	0	0	8	8	8	9	11	12	11	0	0	0	0	0	13	16	16	16
AUSTRALIA	19	17	14	0	0	0	0	10	10	11	11	10	11	13	13	13	13	0	0	0	15	19	20	20

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Rediscovering the Gee-Whiz

One pessimistic view of the radio hobby centers on the notion that modern consumer electronics are so pervasive, who can get excited about the magic of radio communications when anyone can cram a cellular phone in their pocket or purse? I suggest that the truth of this viewpoint depends upon what aspect of the radio hobby caused each of us to experience our original "Gee-Whiz."

The radio hobby is not simply about the movement of radio signals through the air, magical though that may be. Nor is it simply the thrill of communication with folks in our community or across the globe who share our interest. There's a lot of "Gee-Whiz" to be found investigating the hardware and the principles that make radio communication possible—and that kind of curiosity has been going on since the days of Marconi and Fessenden.

Nowadays you may ask yourself where curiosity has gone to, when it seems you can't pry a young person away from a video game or the Internet? But take a long look at what they are doing: Most video games and just about everything involved with the World Wide Web are about exploration, even though much of it is "virtual" rather than "real." But it causes me to wonder, wouldn't real live exploration be a lot more fun than virtual if presented in the right way?

To this end I decided to conduct a few experiments on my "Number Two Son." Most of his free time is spent trying to get some character or other through various virtual worlds on his video game system. But, like most kids, he is intensely curious about the world around him. I intended to see if I could take this curiosity beyond the nearest TV set.

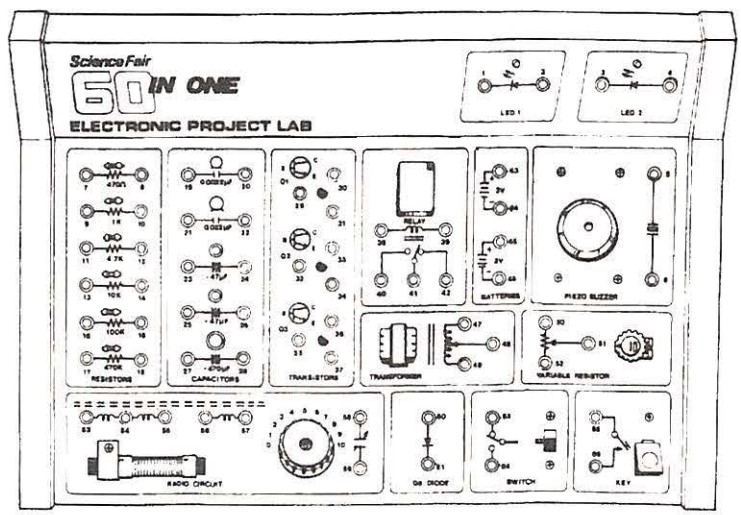
Electronic Theory Made Easy

I took a trip down to my local Radio Shack to see what "after Christmas" bargains might be found, and I came across something I had seen in their catalogs for many years but had never really examined—the Science Fair 60-In-OneElectronic Project Lab (Catalog number 28-261). Hmmm . . . When I was a much younger pup I enjoyed building quite a few Radio Shack "Science Fair" kits before I graduated to Heathkits. This had some potential.

It was listed as being useful to kids from ages ten and up ... in the ball park for Number Two Son's needs. The unit comes practically assembled with around twenty-five components mounted on a work board. These components can be connected to one another by short runs of common insulated hook-up wire (supplied). The ends of the mounted components are attached to little tightly wound springs that serve as easy-to-use binding posts. This set-up makes it easy to quickly wire up a project or change it around. To further facilitate use, each spring connector is assigned a number. All that is required to build any of the sixty projects is to follow the numbered wiring sequence. This makes it great for anyone who has yet to master the art of reading an electronics schematic.

By the way, each experiment includes both the lab-number-oriented wiring diagram and a traditional schematic. Along the way the user is prompted to study the schematic as a way of beginning to understand this basic electronics diagramming concept, essential for moving on to future study. Four common, garden variety, "AA" batteries are all that is needed to power the work board up. The only unmounted items are an earphone and, obviously, the assembly wire.

Even before glancing at the manual I saw some real potential for serious curiosity—six resistors, five capacitors, three transistors, a diode, a relay, two LED's, a transformer, a buzzer, a potentiometer, a variable capacitor, a loopstick antenna, and two switches (one SPST and one momentary type). Experienced as I am in the ways of the radio hobby I had half a dozen ideas already without looking at the manual. There was nothing here that any well stocked junk box wouldn't yield, but the packaging and ease of use make this an ideal learning environment.



The manual is well written and I wish its authors were given well-deserved credit. Each of the 60 experiments is fully explained in basic terms that make clear the intention of the concept presented. Additionally, each experiment has a breakout box labeled "Going Further..." These boxes direct the curious to further investigation of the basic concept.

Maybe I need to stop here for a minute to make an important point: Even though this project lab is essentially marketed to kids, *anyone* interested in the basics of electronics and radio communication could learn quite a few things from playing with this training platform. Remember, the box said ages ten and *up*. Anybody could learn a great deal about basic DC electronics by spending a bit of time with this simple "child's" toy.

The Real Fun Begins

So the Project Lab was brought home and Number Two Son went to work. All the lab lacked was a wire cutter and stripper for the hook-up wire. These items exist in abundance around my shack. Then again, I can always resort to my chipped front tooth that has served me well with number 10 and number 12 gauge wire stripping since the days of "Blinky" Austell's electronics class. (Don't try this at home, I'm a highly trained professional and I'm sure the American Dental

Association would strongly frown on this practice.)

The first series of experiments serve to educate the user to the basic use of the lab while teaching sound foundations about electronics' most basic components. Number Two Son and I began things with a look into the life of the humble diode. By hooking the diode up with one of the LEDs, a resistor, a switch and the battery source, I was able to show my kid how a diode can act as a gate. I was also able to show that the LED was a Light Emitting Diode—a diode with the additional property of emitting photons. Even with this most basic of experiments, Number Two Son was getting a kick out of all those "Star Trek" words. We were a long way from constructing a Photon Torpedo, but the wheels were turning in the right direction.

Next we tackled Series and Parallel connections. By putting the LEDs and the switches in different configurations and tracing the wiring with our fingers, it was easy to see the current paths. We were also able to determine the difference in brightness brought about by how we connected things. This is an important prelude to understanding that basic electronic concept: Ohm's Law. But doing it this way it's just plain fun, and you don't need the math. Since the lab only had two LEDs, I merely had to scrounge my junk box for a few more to wire up longer series and parallel chains to further demonstrate these points.

By experiment 5 and 6 we were wiring up resistors in series and parallel to demonstrate how they control the flow of current. At this point the "Going Further..." boxes do lay out the basic math for Ohm's Law, and my son and I broke out the calculator and a VOM meter and checked to make sure that Ohm's Law hasn't been repealed. (It is still in force as best we could tell.)

Well, after a few more experiments with resistors and LED's, making such things as simple dimmer circuits, we moved on to capacitors. Now things started to get really interesting. The experiments used the concept of the capacitor as an electrical storage tank. When we started to hook up capacitors in both series and parallel, it was fun to watch Number Two Son discover that the mathematical predictions around capacitors were the opposite of resistors. Yep, my boy figured out that you add up resistors in series and capacitors in parallel all by himself.

Next came a series of experiments with the relay that is supplied with the lab. This allowed us to begin to discuss and discover latching circuits and even think a wee bit about digital concepts. However, it was beyond the scope of the kit to show how relays allow low voltages and currents to safely control higher ones. To nail this concept down I once again hit my junk box to show how a nine-volt battery could be used to turn on a house light.

The first twenty experiments brought us up to the transistor. We began by wiring up an LED to the various leads of the transistor to trace how electricity flows through a transistor. In doing this, we saw how the transistor paths act like diodes, only allowing electricity to flow in one direction. This led to further experiments in using the transistor as an electronic switch. It was easy at this point to jump into a discussion of how computers work, topped off by pulling the cover off of my home computer and showing Number Two Son the Pentium Microprocessor chip and its many millions of transistors, all acting like the switches we built with our lab. You want "Gee-Whiz"? I got some there!

I then took the lid off one of my more modern receivers and showed Number Two Son the microprocessor inside that did all the work. (You just knew we were going to get around to talking about radios, didn't you?) You see, I looked ahead in the Lab Manual and saw that we were going to have opportunities to build both receivers and transmitters.

But first, we had the opportunity to make a few amplifiers and oscillators. We built one and two transistor amplifier circuits and learned about Darlington Connections. Then we got to make some noise with a whole series of oscillator circuits, including electronic sirens. Later in the manual these would be combined other things we learned to build—such things as metal detectors and burglar alarms. There's also a circuit of a Morse Code Oscillator. You can bet we'll be using that in the near future!

But the real fun and a lot of "Gee-Whiz" showed up when we got to experiment number 42—a good old fashioned Crystal Radio. I had built Number Two Son a couple of crystal sets over the years, but this was the first one he got to wire up himself. To make the crystal circuit easier to hear, we added a stage of amplification based upon our earlier experiments. Now we were getting somewhere!

At this point I couldn't resist jumping to experiment number 53, a simple one transistor AM transmitter. True, you had to hold it about two feet from a receiver to hear it, but it was real, honest to goodness, wireless radio. I don't think it will be too long now before Number Two Son asks to borrow one of Dad's Part 15 transmitters. I'd better get him started with that Morse code oscillator before he joins the free radio movement.

Well, we went on for almost a week without turning the TV on after I got home from work. I've nudged my kid into the direction of the greatest hobby in the world. But more importantly, I saw that gleam in his eye as he hooked those wires together to make things. The "Gee-Whiz" is still there, my friends. We just have to take the time to awaken it. And have some fun yourself!

Kevin Carey, WB2QMY
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Odds 'n' Ends

DX-160 Update

A few months ago I asked if anyone knew where I could locate a service manual for a Realistic DX-160 receiver. There were three responses, but one came without a return address. My only clue is a brief note written on "Unasyn" stationery attached to the manual copy. Whoever you are, thank you! Another reader pointed me to a very helpful article appearing in the November '89 issue of *MT*. With all of this help, I am well on my way to restoring this classic receiver.

SAQ Transmission

From time to time we've mentioned Swedish longwave station SAQ (17.2 kHz) in this column. This station is the last Alexanderson Alternator still in working condition and is located at Grimeton, Sweden.

In October, word came via the Internet that this old warhorse would be fired up in connection with a ceremony to mark Grimeton station as a historical landmark. Unfortunately, there were conflicting times given for the broadcast, and many probably missed it for that reason. Next time I hope to get more advance notice of the station's schedule.

Bruce Kelley, Curator of the Antique Wireless Museum, was kind enough to forward a color brochure from the station and a note from a Swedish ham. According to the note, a few U.S. listeners *did* hear the station including W2AZQ (NJ), WB2LJW (NH), and Alan Douglas (MA). If you were lucky enough to catch the transmission, I'd like to hear from you. Photocopies of QSL cards would be especially welcome. Here's the exact text of the October 23rd transmission:

CQ CQ DE SAQ CQ CQ DE SAQ CQ CQ DE SAQ
THE RADIO STATION GRIMETON IS NOW DECLARED A LISTED HISTORIC BUILDING BY THE COUNTY COUNCIL OF HALLAND, SWEDEN AND GOVERNOR BJOERN MOLIN

THIS MESSAGE IS TRANSMITTED BY A 200 KW GENERATOR, CONSTRUCTED AT GE BY ERNST ALEXANDERSON 80 YEARS AGO

Finally, for those interested in learning more about SAQ, be sure to check out their web site at **http://www.telemuseum.se/Grimeton/**.

DXpedition Report

In November, I had the privilege of joining members of the Mohawk Valley Short Wave Listeners' Club for a DXpedition at Camp Alderesgate in Brantingham, New York. In addition to enjoying the fine facilities of the camp and the surrounding woodlands, I managed to log several new beacons and even came out of the basement for a bit of shortwave listening, as well.

If you've never tried a rural DXpedition, I can highly recommend it. It is an excellent chance to exchange ideas, try out new equipment, and escape the interference that is often present during home monitoring.

Group photo of MT readers on a DXpedition

The attendees of the DXpedition, many of whom are avid *MT* readers, included (top row): Charlie Rebeck, Kevin Carey, Howard "Mort" Mortimer, John Figliozzi, Roger Chambers, Daryl Rocker, (2nd row): Nick Dudish, *MT's* Jacques d'Avignon and Chet Dougherty. *(Photo courtesy of Nick's wife).*

Web Update

Paulo Santos has announced a new address for his AirNav homepage. The new address is: **http://www.airnav.com/** (the old URL was **http://www.cc.gatech.edu/db1/fly/**). AirNav is the only web site with detailed flight information on every airport and navaid in the U.S.

If your main interest is looking up non directional beacons (NDBs) by identification or frequency, also be sure to check out the site maintained by Chris Piggot (WZ2B) at **http://www.mdsroc.com/navaid**. For European DXers, there is now a site listing Swedish beacons at **http://home1.swipnet.se/~w-12269/**. Check under the WAVE section of this site.

SATNAV vs. NAVAIDS

It should come as no surprise that the emphasis on navigation in the 21st century will be on the global positioning satellites (GPS) rather than ground-based systems. In a report released by the U.S. Federal Aviation Administration (FAA) Administrator David Hinson, a GPS transition plan has been announced that will phase out ground-based systems by the year 2010.

What does this mean for us? Well, first, don't look for a mass exodus of beacons from the band anytime soon. There remains a huge user base of NDB receivers aboard aircraft that will require support for several more years, if only as a backup to the more advanced systems. Also, a thinning of the band could well mean enhanced DXing opportunities for longwave listeners—especially to foreign countries.

This same report also contained a bright spot for natural radio fans. By the end of this year, support for OMEGA navigation system (10-14 kHz) will be discontinued. This global network of eight transmitters has been a major source of frustration for natural radio buffs who enjoy listening and taping these earth sounds.

SSB Lowfer Rig

Curry Communications recently announced their EXP-17 Single Sideband lowfer transceiver. This unit uses a variable crystal oscillator (VXO) that provides for five operating channels. The EXP-17 is available as a kit or fully assembled. For more information, write Curry at P.O. Box 1884, Dept. MT, Burbank, CA 91507.

Loggings

This month's logging are courtesy of Joseph Farenholtz (OH). Besides some impressive stateside catches, Joe managed to log beacons in Cuba, Mexico, and Greenland! He uses a variety of equipment including a Drake R8A receiver, a 70 foot end-fed wire, and an MFJ-956 antenna tuner. Many of his loggings are listed in Table 1.

TABLE 1: Selected NDB Loggings

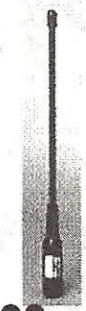
FREQ	ID	LOCATION
194	TUK	Nantucket, MA
248	FRT	Spartanburg, SC
253	YTF	Alma, QUE
270	EZM	Eastman, GA
303	P	Pt. Petre, ONT
306	GN	Godhavn, Greenland
318	HFY	Indianapolis, IN
329	RVN	Rogersville, TN
330	CZM	Cozumel, MEX
332	FIS	Key West, FL
379	TL	Talahassee, FL
387	PV	Providenciales, BWI
423	CKP	Cherokee, IA
513	PP	Omaha, NE
515	ONH	Jefferson City, MO
517	FN	Clinton, IA
517	GQ	Kansas City, MO

NEW PRODUCTS BROUGHT TO YOU BE ELECTRONIC DISTRIBUTORS

WATSON **NEW PRODUCTS...**

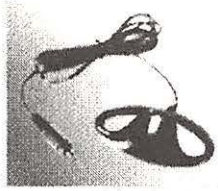
WHX-7000 Dual Bander

the WHX-7000 dual bander for handheld receivers and transceivers. 144/430MHz transmit and receive. Flexible helical, 8.5" long and fitted BNC plug



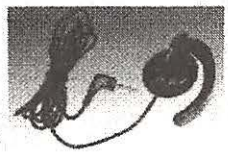
WEP-300K

8 Ohm - Kenwood connector, fits firmly over ear. Lead length 1.5M



WEP-400

Adjustable and removable soft pad. 3.15M lead - 3.5mm plug. K model has 2.5mm plug.



WSM-1900 25-1900MHz

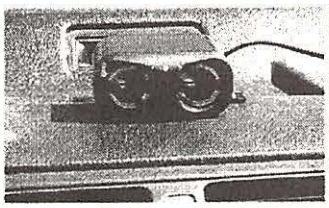
Magnetic Mobile Mount. 1.25" micro-magnetic base, 2.75M coax BNC connector, for wideband receivers.

WSM-270 2M/70cm

1.25" micro-magnetic base, 2.75M coax BNC connector, 50W max.

WATSON

Quality Products from the UK!



Power Pod

Nite Glow Rings and low, mid, high LED's light the night for easy multiple HT & accessory connections to your cig lighter. Three foot cord allows mounting almost anywhere in your vehicle.

AR8000 AOR

All Mode Wide-Band World Band Radio Receiver A new breed of radio receiver which combines full computer compatibility with advanced wide-band radio receiver technology.

The AR8000 incorporates the latest PLL technology and offers a multitude of features including true carrier re-insertion SSB (CW) demodulation with 50Hz frequency steps. 4 level alpha numeric LCD indicates the frequency, signal strength, band scope and more. Selectable squelch system, auto-mode, auto-band-plan, serial communication port are all standard. There are a variety of scan/search commands to link banks, scan by mode, programmable delay scan, priority, auto memory store, step offset and a programmable power save circuit to increase the duration of operation from the NiCads. The list goes on and on!

AR8000 Leather Case

- Heavy duty top grain leather
- Made in USA
- Fits comfortably on belt

SCANCAT GOLD DOS OR WINDOWS VERSION!

SCANCAT presently supports:

- AOR3000/3000(A) & AOR2500, AOR-3030 HF receiver, AOR-8000 (Newest handheld)
- Drake R-8 • MOST Icom Radios • Kenwoods including TS-440, TS-450, TS850 & R5000
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- The NRD-525 & 535 JRC. • LOWE HF-150m • Watkins Johnson HF-1000
- Opto Electronics add-on boards for PRO series Radio Shack Radios

Now Available! Scancat Gold for Windows...Same great features and support you've come to expect ! Super windows graphic and commands for the smoothest possible operation. Now you decide...DOS or Windows 95 or 3.1

Software allows complete control of all functions supported by these radios through the standard manufacturer's interface. SCANCAT allows you to:

1. Enter any one frequency and increment up-down from that point
2. Enter any two frequencies and scan between them with ANY increment, time delay or pause.
3. Scan a file of frequencies, search by description or wildcards.
4. Create databases of frequency files. Sort by any field, and save to disk and/or send to printer.
5. Create 30 personal "Preset:" frequency BANDS for SW, aircraft etc, including increment and mode. The most popular presets are included in the program. Multiple scanning Banks, multiple scanning diskfile banks, unlimited file sizes, dual radio simultaneous scanning, comma delimited conversion, d-base support, scanport gold, direct import of TRS, Macro control per record, command line control, automatic birdie lockout, top hits table.

NEW PRODUCT RELEASE!

Airmaster 3 NOW Available!

LOWE

Without a doubt LOWE's Airmaster 2 ACARS software and interface caused quite a stir in the world of airband listening. Hundreds of aviation enthusiasts are now using LOWE's ACARS software to supplement their monitoring activities. ACARS data comes in particularly fast, especially if you are in a busy location, and the screen soon fills up and scrolls over. Airmaster 3 will resolve these issues and others with many enhanced features:

- Most options now have hot keys, access without having to pull down the menu
- The display of repeat messages can be suppressed and held in memory details of the last 50 messages received are checked against this list.
- Up to six strings of "alert text" can be specified, with program beep. This is designed to help in monitoring particular flight numbers or registration numbers.
- Advanced features for display message suppression and labeling as well as other new "Expert" features.

The Hugger

"At your fingertips" convenience for handhelds and cellular phones. Quick, easy "no holes" mounting using your car air vents. Flexible gripper arms hug your radio yet allows quick, easy release.

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EDCO

Doug Smith, W9WI
72777.3143@compuserve.com

Did I really hear that?

Every once in a while, you hear something really exotic; a station from so far away, or with such low power, that you really can't believe your ears. What really is possible in DX? That station you heard broadcasting in Korean on 1480—was it actually Korea, or did you actually hear something less exotic? You live in Chicago but would like to listen to the Portland Trailblazers' game on the radio—can you get a Portland station? What are the normal limits of DX reception?

If there were only one radio station on each AM frequency, nationwide (and even international) DX would be commonplace. My 100-watt ham station on 1800 kHz uses an antenna that broadcasters would laugh at. But I've contacted 49 of the 50 states and several foreign countries. The 1,000 watt signals of expanded-band stations WJDM, KXBT, and "KTRK" (as well as numerous pirates) prove that AM reception at distances of over 2,000 miles is very possible.

Unfortunately for the DXer, virtually all AM-band frequencies have multiple stations. Interference is the limiting factor in AM DX. And the best predictor of the amount of interference on a frequency is the "class" of the stations on that frequency (see December 1996 American Bandscan for more information). The "clear" channels, used by Class I and II stations, have fewer stations and thus less interference. Next come the "regional" channels used by Class III stations. The "local" channels used by Class IV stations are jammed with interference. Even the most experienced DXers consider any station more than 100 miles away to be excellent DX when logged on a local channel!

At 7,700 miles from Nashville, I don't expect to ever receive KGTF channel 12! If you think you've received this station (and you don't live on Guam), you need to be very skeptical!

The Class I stations have by far the best coverage. Stations like KAAY-1090, WBBM-780, and WBZ-1030 can easily be heard as far as 1,500 miles away under normal conditions and on consumer-grade radios. The powers of Class II stations vary widely. Some higher-power Class IIs like KFEQ-680 may be heard for several hundred miles. But most are low-power outlets that you shouldn't expect to hear more than 200-300 miles from their towers.

Class III frequencies are rather crowded, and power is usually limited to 5 kW. I consider a Class III station 150 miles away to be good DX, and one 300 miles or more distant is an excellent catch. My personal record is about 800 miles, and that reception was extremely weak.

Again, the Class IV frequencies are *very* crowded. My home is 25 miles from two of these stations, and I can't get either one at night. It's actually easier to DX these frequencies during the day (because of the reduced interference). On average, 75 miles is about the limit for daytime reception on Class IV channels.

How about FM and TV? Here, your antenna and location make a huge difference. The typical rooftop antenna in a suburban area can routinely deliver signals from as far as 200 miles. Anything further is DX, subject to the limits of natural phenomena rather than interference and station power.

Help from Mother Nature

There are two primary phenomena responsible for FM and TV DX. Tropospheric propagation is more common. It can enhance signals from as close as 30 miles, but it can also carry things much further. The recognized record for distant reception of a broadcast signal by tropospheric propagation is just over 1,500 miles (WPXT, channel 51 in Portland, Maine, received in the Turks and Caicos Islands off the eastern end of the Bahamas). I've received stations from northern Mexico, just under 1,000 miles from my location. However, both cases involve over-water reception. Distances over land are generally much shorter. Distances of more than 500 miles over land are extremely rare.

These longer distances are, however, covered by sporadic-E skip. This phenomena only affects FM and VHF TV, but distances of 800 to 1,200 miles are common. The limit for a single E-skip opening is roughly 1,500 miles. It is possible for two (or more!) openings to "link," allowing "multiple-hop" propagation. While radio amateurs have used 3-, 4-, and 5-hop skip to cover extreme distances, broad-

AM CALL CHANGES

The following AM stations have changed callsigns:

Old call:	New call:	Frequency & City:
KAAN	KIRK	870, Bethany, MO
KAPY	KKNW	1290, Port Angeles, WA
KAVA	KMCA	1450, Burney, CA
KDFX	KOOO	1190, Dallas, TX
KEGE	KKMS	980, Richfield, MN
KHKR	KKGR	680, E. Helena, MT
KIOA	KXTK	940, Des Moines, IA
KIRS	KIHM	1590, Sun Valley, NV
KJEL	KBNN	750, Lebanon, MO
KKTR	KCBL	1340, Fresno, CA
KLVJ	KMHI	1240, Mountain Home, ID
KQRS	KDIZ	1440, Golden Valley, MN
KSBT	KBCR	1230, Steamboat Springs, CO
KUUY	KMRZ	650, Orchard Valley, WY
KVEG	KXNT	840, Las Vegas, NV
KVVA	KMVP	860, Phoenix, AZ
KXTN	KPOZ	1310, San Antonio, TX
new	WPNP	780, Mulberry, FL
new	WJNL	750, Petoskey, MI
WAIU	WRNJ	1000, Hackettstown, NJ
WNCQ	WCIZ	1410, Watertown, NY
WODZ	WFRY	1450, Rome, NY
WPDQ	WBWL	600, Jacksonville, FL
WRVH	WRNL	910, Richmond, VA
WSCR	WYPA	820, Chicago, IL
WSFN	WMHG	1600, Muskegon, MI
WTMM	WVNZ	990, Richmond, VA

WSLM-1220, however, is a more reasonable target. Most DXers east of the Mississippi stand a chance of getting one of these cards.

cast propagation seems limited to two hops and distances rarely much over 2,000 miles. Even this is very rare—I've never seen a two-hop opening in my 10 years of FM/TV DXing.

So now you know when to accept a logging as fact, and when to be skeptical about it! And you know that, when your Uncle Arnold asks you to tune in the Cal State football game on that 5,000 watt station 2,000 miles away, that he's just dreaming...

Bits and Pieces

• The new AM station approved last year for Elko, Nevada, is now on the air. The call letters are KTSN, and it broadcasts on 1340 kHz with an all-talk format. As you've just read, it's going to be very difficult to log this one (unless you happen to live in Elko!)

• John Mayson of Palm Bay, Florida, has been busy on the AM dial. He's logged WKHX-590 Atlanta with the new "Radio Disney" children's format, similar to what WJDM-1660 airs. Also logged was an unidentified station on 1680 playing light rock music, with no announcements heard. There is an experimental station licensed on this frequency in Bluff City, Tennessee, but nobody has heard anything except test tones on that station. My guess is that John heard an unlicensed station.

• Have you ever run into the frustrating situation where a DX station airs a string of local commercials, none of them mentioning the name of the city served? John has found an Internet site that can help. **www.switchboard.com** has searchable listings for all U.S. businesses. I used this site to identify a mystery NBC TV station on channel 56 with an ad for "Hastings Books and Video." A check of the Internet showed numerous Hastings locations in northeast Texas; the TV station was KETK-TV Jacksonville, Texas.

• Believe it or not, ice forming on broadcast antennas and towers is a more serious problem here in the South than it is in the colder Midwest. However, a November storm took two Minnesota stations off the air temporarily. KWOA-730 and KWOA-FM "KO-95" lost their 600-foot tower in a November ice storm. According to a Worthington *Daily Globe* article forwarded by Lloyd Matthiesen, the tower collapsed on itself, landing a few feet from the station's back door. Nobody was injured. Another article the next week indicates the station had returned to the air on reduced power of 200 watts on the AM dial.

One doesn't build towers in winter in Minnesota; I suspect (and the paper reports) KWOA won't be able to rebuild its tower and return to full-power operation until spring. (Unfortunately, the storm also took down Lloyd's antenna, a 100-foot longwire...)

I want to take a minute to thank everyone who's been sending clippings, letters, and email. I really appreciate all of it, and wish there was space to use it all. Please keep the information coming to American Bandscan, Box 98, Brasstown NC 28902-0098 or 72777.3143@compuserve.com.

DX TEST BULLETIN

These special broadcasts provide a unique opportunity to hear and identify the following stations. If you hear these broadcasts, please report to the address provided.

Mon Mar 3 - Thur Mar 27 - WWCN-770 (P.O. Box 9600, Estero, FL 33928) will test at 1 kW directional every Monday through Thursday 12:30 - 1:00 am EST (0530 - 0600 UTC) during March. Morse code ID's inserted during regular programming of old-time radio serials and vintage comedy. Send reports t to: Mr. "Joey C." - Program Director

Mon March 3- KFGO-970 (1020 25th Street South, Fargo, ND 58103) will test at 5 kW nondirectional 1 - 1:30 am EST (0600-0630 UTC). Morse code ID's. Send reports to: Mr. Marty Berlinger - Chief Engineer.

Mon March 10- WKBF-1270 - Rock Island, IL will test at 5 kW directional 1 - 1:30 am EST (0600-0630 UTC). Morse code ID's. Send reports to: Mr. Jon Book (KB0EDE) - Engineer, c/o Quad Cities Radio Group, 3535 East Kimberley Road, Davenport, IA 52807.

Sun Mar 23 - KKFJ-570 (P. O. Box 570, Alturas, CA 96101) will test at 5,000 Watts nondirectional 3 - 4:00 am EST. Morse code IDs. Send reception reports to: Mr. Daniel R. Frey (K6YXE), Chief Engineer

These tests were arranged by J.D. Stephens for the International Radio Club of America Courtesy Program Committee. (Send 32-cent stamp, or US$1 or 1 IRC if overseas, to P.O. Box 1831, Perris, CA 92572-1831 for sample IRCA bulletin.)

George Zeller
George.Zeller@acclink.com

WJDI Breaks Pirate Power Record

Listeners throughout North America were startled on Christmas Eve by the most powerful signal that has ever been put out by a pirate in this hemisphere. **WJDI,** famous in the past for its technical prowess, blasted forth on 1620 kHz with a new 15,000 watt transmitter! Chief Engineer George Donahue, in an interview with *MT*, said that it took 2,000 hours to construct this monster transmitter. Including the power supply and station equipment, the new facility cost $15,000, or a dollar a watt. The station used a 5 element cage antenna erected 75 feet above the ground.

Donahue has received hundreds of reception reports from 43 states and every Canadian province except British Colombia. Many listeners noted the extremely clean and well modulated signal that came from the station, rivaling or exceeding the technical standards used by most commercial mediumwave stations. As in the past, the station format was rock oldies music and comedy advertisements.

WJDI quickly mailed out plenty of sharp QSL's. If you heard them, reception reports go to 570 Ulster Avenue, Kingston, NY 12401. Station IDs featured a slogan of "the King of Pirates." This historic broadcast certainly lived up to the name.

WJDI Competitor Busted

According to the Christmas edition of *Radio World*, **WDBS-FM** in Bolingbroke, Georgia, transmitted on 102.1 MHz between September 1995 and November 29, 1996, despite the fact that the FCC had not issued them a license. General Manager William Taylor said that the station finally went silent to avoid "a negative impact" on the application of station owner Joseph Kendrick's reapplication for a broadcasting license. The FCC had previously revoked the station's expired construction permit and denied a license application. Did any of our Georgia readers hear this station? It was, at least technically, a pirate.

1996 Activity Sets Record

It's now official. Research by *Monitoring Times* finds that nearly 280 different North American pirate stations were active in 1996. This breaks the previous record set in 1994. Some pundits, including this magazine, have puzzled over a flat trend in worldwide shortwave broadcasting. The alleged slump certainly doesn't apply to pirates!

New ACE President

Longtime *MT* subscribers will recognize the name of Pat Murphy of Chesapeake, Virginia, who has often contributed to this column over the years. The Association of Clandestine radio Enthusiasts has announced that longtime ACE President Kirk Baxter has retired, and that Pat has replaced him. With the assistance of Steve Rogovich, Pat will be publishing monthly issues of *The ACE*.

Since 1982, ACE has provided detailed coverage of the unlicensed broadcasting scene. Pat says that new columns, an expanded bulletin, and an improved internet web page are forthcoming in 1997. Annual subscriptions are $20 in the USA, $21 to Canada and Mexico, and $27 elsewhere in the world. Pat Murphy notes that the ACE address has changed, and is now P.O. Box 12112, Norfolk, VA 23541.

Radio Free Lenawee Still On

Last month we mentioned the FCC bust of Radio Free Lenawee, operatedby Rev. Rick Strawcutter in Adrian, Michigan. The station remains on 97.7 MHz despite the bust, with Strawcutter calling himself the "Rosa Parks of Radio." Stay tuned. Thanks go to Ira Paul, Royal Oak, Michigan; James Luman, Tiffin, Ohio; and Michael Kuentz of Waterford, Michigan, who sent in fresh material on the situation.

Clandestine Web Site

Clandestine buff Nick Grace operates a new internet site covering clandestine radio. The web page, titled Clandestine Radio International, is chock full of information about clandestines currently operating throughout the world. It includes links to other sites with data on the stations. A URL of **http://gwis2.circ.gwu.edu/~gringo/** takes you to this truly excellent resource.

What We Are Hearing

Your pirate loggings are always welcome via P.O. Box 98, Brasstown, NC 28902 USA, or via the e-mail address at the top of the column. All frequencies are in kHz, with times in Coordinated Universal Time (UTC).

The amazing WJDI 15 kW pirate transmitter

North American pirate stations listed here use the following addresses: P.O. Box 1, Belfast, NY 14711; P.O. Box 109, Blue Ridge Summit, PA 17214; P.O. Box 28413, Providence, RI 02908; P.O. Box 146, Stoneham, MA 02180; P.O. Box 605, Huntsville, Alabama 35804; P.O. Box 88, Moline, MI 49335; P.O. Box 5617, Ventura, CA 93005; P.O. Box 293, Merlin, Ontario N0P 1W0; and P.O. Box 3103, Napier, New Zealand. For return postage, enclose three 32¢ stamps in the envelope to United States addresses. $2 US or two International Reply Coupons go to foreign maildrops.

6YVOS- 6955 at 2300. The Voice of Smoke is active again with reggae music from Jamaica, "sponsored" lately by Dr. Jack Kevorkian. Addr: Belfast. (Charles Crawford, Henderson, KY; William Hassig, Mt. Prospect, IL; Harold Frodge, Midland, MI)

Alan Masyga Project- 6955 at 2345. They play Alan Parsons Project rock, with ID's stolen from a tape sent in to them by *MT* contributor Alan Masyga. Addr: Providence. (Rich and Talea Jurrens, Katy, TX; Lee Silvi, Mentor, OH)

Anteater Radio- 6955 at 1815. So far this new one has transmitted rock and ID's, but its format appears to be evolving. Addr: Belfast. (Mike Prindle, New Suffolk, NY; Silvi)

Cat in the Hat- 6953 at 1815. Using CITH call letters, they program stories by Dr. Seuss. Addr: Providence. (Jerry Coatsworth, Merlin, Ontario; Howard E. Lyon, Oz; Prindle; Silvi; Murphy; Crawford)

Dyke Radio- 6955 at 0200. This unusual new station transmits feminist messages in Morse code. Addr: None. (Jeff Ryan, Yardley, PA)

Earth Radio- 6960 at 0300. Richard sent in two logs this month, but both were relatively rare intercepts. They play classic rock. Addr: Providence. (Richard Arndt, Austin, TX)

FBI Radio- 6955 at 0400. This one has nothing to do with lawmen. Its rock music uses the slogan "Females Broadcasting Interference." Addr: None. (Alan Roberts, St. Lambert, Quebec; Barry Williams, Enterprise, AL; Prindle; Silvi)
Free Hope Experience- 6955 at 1945. Major Spook's rock and comedy shows frequently promote pirate and amateur radio. Addr: Blue Ridge Summit. (Kevin Nauta, Grand Rapids, MI; Frodge; Prindle; Williams; Silvi)
Friday Radio- 6955 at 2345. They still transmit on Friday to celebrate the beginning of the weekend. Addr: Providence. (Williams)
Happy Hanukkah- 6955 at 1615. Jewish stories and show tunes are heard seasonally on this veteran pirate. Addr: Merlin. (Neil Wolfish, Toronto, Ontario; Williams; Prindle; Silvi)
Jerry Rigged Radio- 6957 at 2230. Their rock music format has appeared again in 1997. Addr: Providence. (Williams)
Key West Radio- 6955 at 2330. This South Florida theme pirate is intermittently active. Addr: None. (Jurrens)
KIWI- 7475 at 0730. Rob hears Graham Barclay's New Zealand pirate fairly regularly. You have to stay up late to hit the Oceania greyline. Addr: Napier. (Ross)
KOLD- 6957 at 2215. Aldo Batista's big band format is promoted as a "hot hits" playlist. Addr: Stoneham. (Joel Gosse, St. Paul, MN; Hassig; Jurrens; Coatsworth; Frodge)
KRAP- 6955 at 0230. Few heard this station, but it was active late in 1996 with a format of classic rock. This was Richard's first pirate log; nice catch! Addr: None. (Arndt)
Laser Hot Hits- 6955 at 1715. When you hear a Europirate at this time of day, propagation tells us that it's from a North American relay. Addr: Merlin. (Rick Doehner, Pasadena, TX; Crawford)
Mystery Radio- 6955 at 0100. Electronic and techno music is the normal fare on this one. Addr: Stoneham. (Crawford; Jurrens; Doehner; Prindle; Williams)
Omega Radio- 6955 at 1600. Dick Tator's Christian rock shows are easily identified by their interval signal of rock riffs from "Spirit in the Sky." He's added more comedy lately. Addr: Moline. (Crawford; Prindle; Silvi)
ORTQ- 6955 at 1645. The abbreviation for this one has caught on; it's the only French language pirate currently active in North America. Addr: Providence. (Lyon; Wolfish; Silvi; Frodge; Prindle)
Pirates Den- 6955 at 1630. This new one reads items from Edward Teach's column in *Popular Communications* magazine. Addr: None. (Crawford)
Pirate Radio Boston- 6955 at 0130. Charlie Loudenboomer and Mr. X have returned with miscellaneous music and talk about pirate radio. Addr: Stoneham. (Coatsworth; Murphy; Ryan; Crawford; Wolfish; Silvi; Frodge; Prindle)
Radio Eclipse- 6955 at 1900. Steve Mann uses a chime interval signal, followed by rock, in-studio banter, and genuine old radio ads. Addr: None yet. (Frodge; Prindle; Silvi)
Radio Free Brooklyn- 6955 at 1645. This new oldies rock pirate (with a WRFB call) said that reports should be sent to magazines, but they should start working with a maildrop service. Addr: None. (Doehner; Crawford; Silvi)
Radio Free Speech- 6955 at 2145. Bill O. Rights was the most active North American shortwave pirate station in 1996. He's says that Earl Pitts, arrested as a spy, is not *the* Earl Pitts who is the station's editorial director. Addr: Belfast. (Howard Espravnik, Gallatin, TN; Hassig; Ryan; Jurrens; Wolfish; Murphy; Prindle; Crawford; Frodge; Silvi; Coatsworth; Ross; Williams; direct from the station)
Radio Free Pennsylvania- 6955 at 1500. Part of the dark side of pirate radio, they transmitted false information about another pirate's location. Addr: None. (Silvi; Lyon)
Radio Garbanzo- 6955 at 2145. It's hard to believe, but the raunchy side-splitting humor of Fearless Fred has now been heard on the pirate bands for ten years. Addr: Belfast. (Murphy; Wolfish; Silvi; Prindle; Williams)
Radio KAOS- 6955 at 0045. Joe Mama always plays rock music; sometimes complete album cuts. Addr: Belfast. (Williams; Murphy; Silvi; Axelrod)
Radio Three- 6955 at 2215. Two versions of this syrupy pop oldies station exist, the regular one and a fake. The impostor, **Totally Bogus Radio Three,** sent a QSL to Harold. Addr: None; occasionally verifies logs in *The ACE*. (Ken Coughlin, Shelby Township, MI; Murphy; Williams; Wolfish; Frodge; Silvi)
Radio USA- 6955 at 1645. Amazingly, Mr. Blue Sky and Joe King have transmitted punk rock and comedy for 14 years. Addr: Belfast. (Prindle; Silvi; Williams)
Radio USA (fake)- 6955 at 1715. Also known as "The Real Radio USA," this impostor returned with reruns of former shows attacking George Zeller and Andrew Yoder. Addr: None, sometimes QSL's logs in *The ACE*. (Crawford; Frodge; Prindle)
RFM- 6955 at 0600. H. V. Short has been firing up his transmitter late at night. Heprograms diverse mellow music and comedy. Addr: Belfast. (Crawford)
Rock-It Radio- 6955 at 2230. In addition to their normal relays via European and North American licensed transmitters, this one shows up on the pirate bands. Addr: Ventura. (Jurrens; Frodge)
Solid Rock Radio- 6955 at 1445. Dr. Love's soul music is now broadcast in parallel on 105.1 MHz FM. Addr: Belfast. (Doehner; Ryan; Crawford; Silvi; Lyon; Williams)
Stereo Sound Radio- 6955 at 2145. This new rocker was widely heard, but nobody noticed actual stereo modulation in their upper sideband signal. Addr: None. (Shawn Axelrod, Winnipeg, Manitoba; Jurrens; Silvi; Williams; Ross)
Tellus Radio- 6955 at 0430. They seem to have settled on a rock music format. Addr: Providence. (Andrew Yoder, Blue Ridge Summit, PA; Prindle; Silvi; Williams)
The Fox- 6955 at 0345. The flagship station for the Fox Broadcasting Network features comedy and parody bits. Addr: Providence. (Crawford; Lyon; Silvi; Williams)
The Talking Pirate- 6955 at 2130. As advertised, the announcer talks on this new one, but he mixes in recorded comedy. Addr: None. (Nauta; Crawford; Coatsworth; Frodge; Silvi; Yoder; Williams; Ross)
Up Against the Wall Radio- 6955 at 1800. Owsley still recreates the late 1960's on most shows, but his productions now include more comedy. Addr: Providence. (Silvi; Crawford; Lyon; Murphy; Williams)
Up Your Radio Shortwave- 6955 at 1730. The elaborate left wing productions on this one are well done. When their QSL's show Rush Limbaugh as a pig, you know they're not endorsed by Newt Gingrich. Addr: Blue Ridge Summit. (Coatsworth; Crawford; Sivli; Lyon)
Voice of Anarchy- 6955 at 2300. It's good to see the return of veteran pirate Leonard Longwire, who programs different musical styles in every broadcast. Addr: Blue Ridge Summit. (Axelrod; Jurrens)
Voice of Ba Ba Booey- 6955 at 2015. They play a Cajun version of "Old MacDonald" called "Looky, Looky Here." Addr: None. (Silvi)
Voice of Christmas- 6955 at 1600. The Yuletide music from this one uses an "O Tannenbaum" interval signal on a music box. Addr: Providence. (Ryan; Coatsworth; Crawford; Murphy; Prindle; Wolfish; Frodge; Yoder; Silvi; Williams)
Voice of Helium- 6955 at 1500. This gas-oriented pirate sometimes ID's as "The Gasman." Addr: Providence. (Nick Terrence, Huntington, NY; Ryan; Silvi; Murphy; Williams; Doehner; Jurrens; Ross)
Voice of Indigestion- 6955 at 1815. Harold says that their transmitter and their stomach had technical problems during holiday shows. Addr: Unknown. (Frodge; Silvi)
Voice of the Purple Pumpkin- 6955 at 2015. Many stations have used this ID in pirate history, so it's hard to tell who the latest version is. Addr: None. (George Zeller, Cleveland, OH; Wolfish)
WARR- 6955 at 0030. After a lull for a few months, this station has resumed frequent activity with rock music and advocacy of marijuana legalization. They're now announcing an address, but it's unconfirmed. Addr: Belfast. (Jurrens; Hassig; Doehner; Crawford; Coatsworth; Frodge; Prindle; Williams; Silvi)
WBIG- 6955 at 1530. On this new one, Big Mike says he's a big guy with a big microphone. Addr: Belfast. (Ryan; Silvi; Crawford; Wolfish; Frodge; Prindle)
WGLR- 6955 at 1600. Rock music is the staple on Green Lantern Radio. Addr: Belfast. (Crawford; Murphy; Doehner; Prindle; Coatsworth; Wolfish; Frodge; Silvi; Williams)
WJDI- 1620 at 0215. See the headline article! (Murphy; Frodge; Ross; Coatsworth; direct from the station)
WKND- 6955 at 1545. Radio Animal, famous builder of "Grenade" low power AM shortwave transmitters, still takes to the air occasionally with rock and comedy shows. Addr: Blue Ridge Summit. (Ryan; Crawford)
WLIS- 6955at 2130. Jack Boggan's interval signal broadcasts are still unique, but lately he's added football discussions. Addr: Blue Ridge Summit. (Crawford; Frodge; Coatsworth; Silvi; Williams; Yoder; Ross; Prindle)
WMPR- 6955 at 1645. This music station has always featured techno-rock and electronic music. Addr: None. (Williams; Coughlin; Wolfish; Silvi)
WPRS- 6955 at 1945. Comedy and novelty bits make this one entertaining. Addr: Providence. (Doehner; Crawford; Coatsworth; Silvi; Lyon)
WREC- 6960 at 2045. P. J. Sparx adds cameo ID's by other pirates to his rock and comedy format. Not all pirates use 6955 kHz; it pays to tune around a little bit. Addrs: Belfast and Blue Ridge Summit (Ryan; Crawford; Ross; Terrence; Frodge; Doehner; Silvi; Murphy; Williams; Coatsworth; Lyon)
WSKY- 6953 at 2100. The slick rock oldies programming at "Whiskey Radio" have been with us since 1991. Addr: Belfast. (Yoder; Frodge)
WSRR- 6955 at 1645. Diverse shows from this new operation have included gospel music, rap tunes, and Europirate relays. This might be a new call for Solid Rock Radio. Addr: Belfast. (Frodge; Crawford; Prindle)

Ike Kerschner, N3IK

Morse Keys

I have been a CW (Morse code) operator since first getting my Novice ticket in the early 1950's. It's a mode I enjoy, and use more than any other—to me it is the essence of ham radio. My first Morse key was a surplus J-38: it is tough, easy to use, and still has a place of honor in my shack.

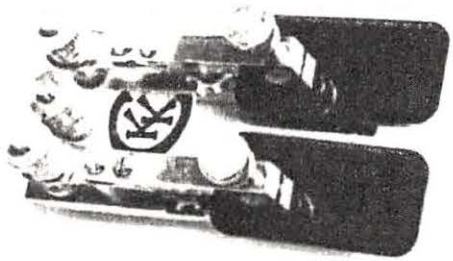
As my code speed increased, upgrading to a bug became necessary. I found the bug somewhat more difficult to master, but certainly a lot easier to use over extended periods. Perhaps the hardest part of learning to send with a bug was getting the proper rolling motion with the wrist and applying the correct pressure to each side of the paddle so as not to drop a dit or send extra dits. Setting a bug up correctly can take a long time. Once properly set up, the settings are locked in and the bug is handled with care so the adjustments are not disturbed.

The late 50's saw the introduction of the electronic keyer along with a lot of terrible CW, as most operators had difficulty getting the hang of letting go of the *dah* side before sending a few extras. Initially, modified bugs or homemade paddles were used to operate the electronic keyers, and the motion of sending stayed pretty much the same—a rolling motion with the wrist identical to operating a bug, but getting off the dah side faster.

The Kitano Key

About a year ago, advertisements for the Kitano Key began appearing in various amateur publications. The Kitano was touted as a new type of key, or keyer paddle. I decided to give this new model a try to see if there was anything to the hype.

The difference between the Kitano key and other types of paddles is that you use your thumb and forefinger in a vertical motion, not unlike that of a straight key. A second and significant difference is that the Kitano key takes up about one fourth the space of any other paddle on the market. This key can be used as a straight key by the novice, and then as a paddle after graduating to an automatic keyer.

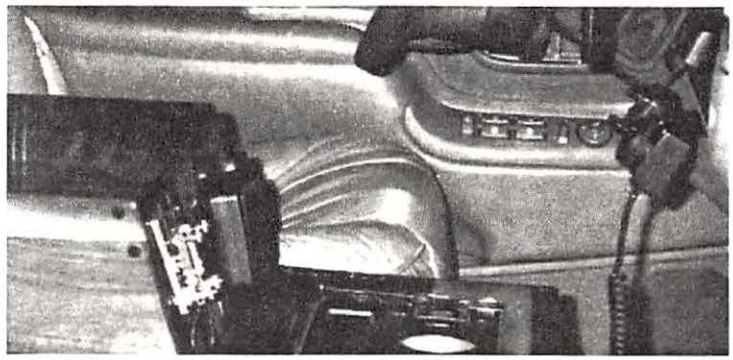


Initially I was a bit skeptical, recalling that a straight key was okay for a short time but tiring for longer sessions. Hooking the Kitano into my Morse Machine keyer, I was pleased with the ease of sending with it. In fact, it was easier to operate over extended periods than any other paddle I have ever used. At an average sending speed of 15 to 25 words per minute (WPM), the Kitano is a joy to use. When attempting to send above 30 WPM or so, I find the key difficult to use, but I'm sure that my ability will improve with further use.

After using the key as a key paddle for several days, I removed the keyer and hooked the Kitano up as a straight key. Using both sides of the key I was able to maintain speeds of 20 WPM for very long periods of time without undue fatigue. In fact, I have to say that even as a straight key, the Kitano is best I have ever used! I'm sure that many owners will never hook it into a keyer since it is so much fun to use as a straight key.

At a size of 1/4 x 1-1/2 x 3 inches the key will fit anywhere. It is very stable and does not slide all over the desk, and it can be mounted in any position (even vertical). It is the ideal key for mobile CW ops as it can be mounted onto any surface. I might mention that two models of the Kitano Key are available, a standard model and a unit that has a spring, applying back pressure so the key can be used in areas of high vibration or motion such as automobiles or trucks.

The Kitano Key is available from Kitano Key Company, 619 Cherry Valley Rd, Princeton, NJ 08540. Price is $55.00 for the standard key, and $85.00 for the mobile model (with spring) plus $7.00 for shipping and handling.



Here is Dave Yingling's, AA0FN, key mounted in his suburban. Many Kitano Key owners use the key mobile because it is small, sturdy and comfortable.

Shareware

Shareware is computer software that is available on a trial basis. In other words, you purchase a copy, look at it for awhile, and if you like it, register it with whomever produces it to receive upgrades and additional info on the program.

One of the problems with shareware is that a lot of it is poorly designed or does not run properly. Of course, you pay your money and take your chances. It would be nice if you could know before paying anything if the program will do what you want it to.

Since I go to a lot of hamfests I do buy a great deal of shareware. Over the past two years, I have chosen a number of shareware programs that run well, work as promised, and are truly worth the price. The software I have examined is for the most part radio related, although there are a few nonradio pieces of software in my collection. I have compiled a fairly lengthy list, including complete details on what the software is, how it runs, and hardware required to run it. If you would like a copy of my list in order to make more informed purchases, send a business size, self addressed, stamped envelope (SASE) to Ike Kerschner, 6347 Chapmans Road, Allentown, PA 18106.

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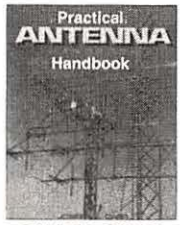

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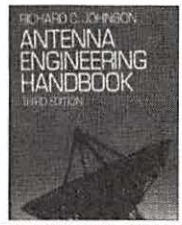

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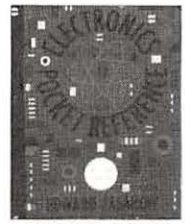

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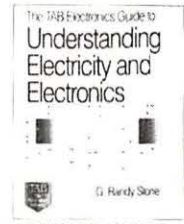

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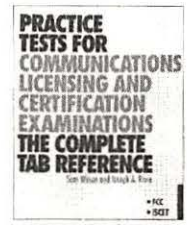

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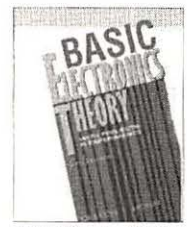

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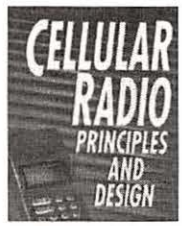

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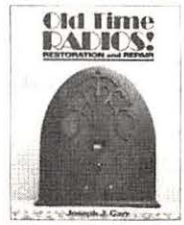

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Doug Demaw, W1FB

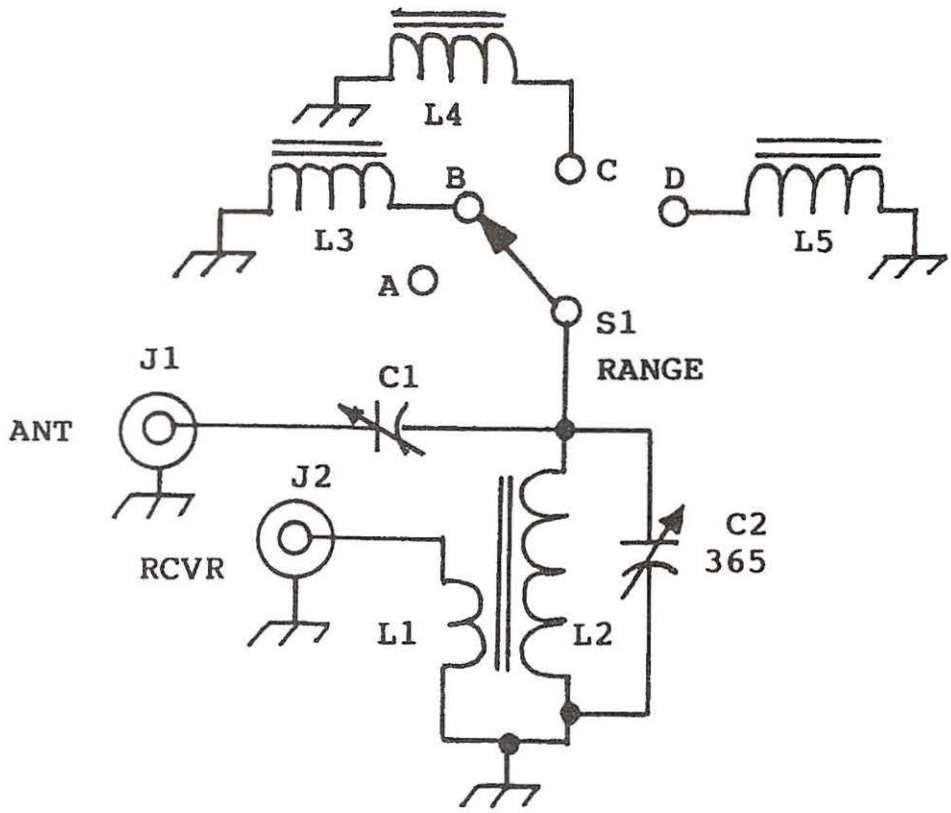
Tuning the End-Fed Wire Antenna

Many shortwave listeners use random lengths of wire for general purpose antennas. Various schemes for resonating these antennas and matching them to the 50-ohm input of a receiver have been discussed in the literature. Some of the methods used are cumbersome and difficult to build and adjust. This month we will discuss a band-switching mini-tuner that will work with any end-fed length of wire to enhance reception and help reject strong signals that are apart from the desired monitoring frequency.

You may hear people refer to wire antennas without feed lines as "long wires." Actually, that term is a technical misnomer. A true long-wire antenna is a device that is one wavelength or greater in length at the particular operating frequency. Hence, a one-wavelength wire for, say, 2 MHz would be 492 feet long. Factually, a large end-fed wire may be long only in terms of its English or metric dimensions.

Because most end-fed wires are cut to fit into available space on a shortwave listener's property, they are seldom resonant at favored listening frequencies. However, at specific frequencies from 550 kHz to 30 MHz they may be resonant as 1/4-, 1/2- 3/4- or 1-wavelength antennas.

Furthermore, the characteristic impedance of these wires changes with frequency. The impedance (ac resistance in ohms) may be anything from 15 to 2000 ohms at a given frequency. An antenna tuner will convert these random impedances to 50 ohms, which is the usual receiver input impedance. Maximum signal or power transfer occurs only when unlike impedances are matched. Along with solving this problem, a resonant tuner (figure 1) provides additional receiver front-end selectivity (rejection of unwanted signals elsewhere in the radio spectrum).



S1 POSITION	
A	550 to 1600 kHz
B	1.6 to 5 MHz
C	5 to 15 MHz
D	8.5 to 40 MHz

FIGURE 1 — *Schematic diagram of a resonant band-switched antenna tuner for receiving. C1 is a 100 pF ceramic or silver-mica capacitor. A 200-pF variable may be used (see text). C2 is a 365-pF variable capacitor. L1 is 15 turns of no. 28 enam. wire over the grounded end of L2. Coil L2 (230 µH) has 152 close-wound turns of no. 28 enam. wire on a 1- by 3-inch piece of PVC tubing or other low-loss tubular form. L3 (30 µH) has 21 turns of no. 26 enamel wire on an Amidon FT-50-61 ferrite toroid. L4 (3.5 µH) has 27 turns of no. 26 enamel wire on an Amidon T50-2 toroid. L5 (0.4 µH) has 10 turns of no. 24 enamel wire on an Amidon T50-6 toroid. J1 and J2 are RCA style phono jacks. S1 is a single-pole, 7-position rotary wafer switch (Mouser no. 10WW017) with four positions unused.*

A Practical Antenna Tuner

The simple circuit in figure 1 uses an air wound main coil (L1, L2) and three small toroid coils to provide coverage from 550 kHz through 40 MHz. L2 is used by itself for resonating and matching a wire antenna during reception in the standard AM broadcast band. C2 is adjusted for peak signal response as noted by the receiver S meter or audio output level. L1 connects to the receiver antenna jack. It provides a tuner output impedance of roughly 50 ohms.

Figure 1 shows a variable capacitor at C1. The pictorial drawing in figure 2 illustrates a fixed-value ceramic capacitor for C1. A 200-pF variable capacitor would be a good choice if this type of tuner were used with a transmit-

ter. If both C1 and C2 are variable, the operator can adjust the antenna system SWR for 1:1 by juggling the settings of both capacitors. However, C1 would have to be floated above ground by means of an insulated tuning shaft if it were a variable capacitor. You may want to use a variable capacitor at C1 for on-the-nose matching purposes. A 100 pF or less (10 to 100 pF) fixed-value capacitor will provide acceptable performance for most receiving applications. Use the smallest value that will not cause a loss in received signal strength. The smaller the C1 value the greater the selectivity of the C2/L2 tuned circuit.

Toroidal coils L3, L4, and L5 are selected by means of S1 to accommodate the frequencies above 1600 kHz. They are switched in parallel with L2 to lower its effective inductance. The turns ratio of L1 and L2 remains the same when this is done. Inductances in parallel yield a lower net inductance, as is the case with resistors in parallel. Coils that are connected in series yield a higher net inductance. L3, L4, and L5 have progressively lower values of inductance in order to make L2 exhibit reduced inductances for various segments of the HF band.

Construction Tips

There is no reason why you can not use wood or plastic for the chassis and panel of the figure 1 tuner. A non-metal chassis and panel would simplify the mounting of C1 if it were a variable capacitor, since neither its rotor nor stator should be grounded.

Figure 2 shows a suggested arrangement for the tuner parts. There is nothing critical about the layout. The important consideration is to keep all of the leads as short and direct as practicable. Excessively long RF leads introduce unwanted parasitic inductance that can spoil the tuner performance from 10 to 30 MHz, especially.

The two antenna jacks are RCA style phono connectors. You may use any type of coaxial connector at J1 and J2. The ground connection can be made to a 1-inch, 6-32 machine screw at the rear of the tuner, as shown.

If you plan to make C1 variable, consider utilizing the tuning capacitor froma discarded BC-band transistor radio or Mouser part no. 24TR222.[1] Connect the two sections in parallel to obtain approximately 200 pF of capacitance. A 1/4-inch dowel rod can be glued to the existing short capacitor shaft to allow adjustment from the front panel. If you are unable to locate a 365-pF broadcast band variable capacitor, you may use a Mouser no. 24TR218 capacitor with both 266-pF sections connected in parallel. These capacitors are not suitable for transmitting applications. Metric mounting screws are part no. 48SS003. Toroid cores are also available by mail.[2]

In Summary

The tuner is a good weekend project, even for beginners. Operation is simple. With the receiver and antenna connected to the tuner, adjust C2 through its range. If there is no increase in received signal strength, try each S1 position and readjust C2 for a peak. There will be a sharp rise in signal strength when the correct setting is found.

The tuner may be used also with coax-fed antennas. Dipoles and verticals that are cut for a specific frequency do not operate efficiently at some far-removed frequency because they are not resonant there. An antenna tuner can perk up the signal in such situations by providing an impedance match between the feed line and the receiver. Off-frequency antenna operation causes impedances other than 50 ohms to be appear at the station end of the coax cable.

Notes

1 — Mouser Electronics, 2401 Hwy. 287 N., Mansfield, TX 76063-4827. Phone: 1-800-346-6873 for catalog or ordering.
2 — Amidon Assoc., Inc., 3122 Alpine Ave., Santa Ana, CA 92704. Phone: (714) 850-4660 for catalog or ordering.

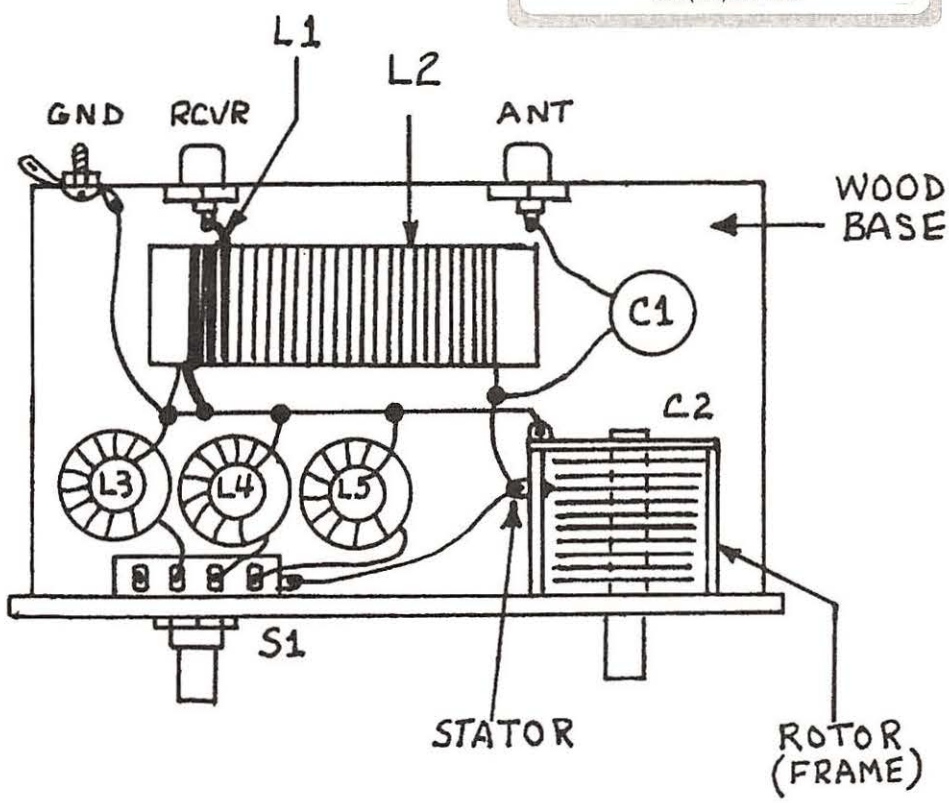


FIGURE 2 — *Pictorial drawing of the figure 1 tuner. The layout is not critical provided all leads are short and direct. The assembled unit need not be enclosed or shielded, except for keeping dust out of the tuning capacitors.*

Jean Baker, KIN9DD

Air Traffic Trinity

Welcome aboard, and happy St. Patrick's day! This month we will briefly review the trinity of air traffic control (ATC), because just about everyone who sent in answers to the September quiz missed the question pertaining to the three areas of air traffic control. Specifically, we'll look at ATC communications so we can understand what we're hearing when we monitor them.

1.) Tower and TRACON: The tower controller gives permission for landings and takeoffs. He (or she) also receives handoffs from the approach controller on inbound traffic, and hands off outbound traffic to departure. The ground controller oversees all movement on the airport surface by aircraft and ground vehicles. Clearance delivery is handled by a controller who gives IFR (instrument flight rules) and also some VFR (visual flight rules) clearances. Tower personnel can visually see the traffic they work, but also depend on a radar unit called the "BRITE Display."

In the terminal radar approach control (TRACON) we find controllers working approach and departure traffic. In most large airports, theTRACON and tower are in separate buildings; however, in others, they are colocated, albeit on different floors. The TRACON is dimly lit so that the controllers can see their radarscopes upon which aircraft are represented by slashes and numbers. Traffic is usually worked from 10,000 feet on down to the surface. Controllers only see their traffic on the radarscopes.

2.) Air Route Traffic Control Centers. Controllers in these facilities handle traffic en route between destination airports. Their area of coverage ranges from 11,000 feet up to the limits of controlled airspace—60,000 feet. Ninety-nine percent of their traffic is IFR. Time and workload permitting, they will give advisories to VFR pilots. They also handle takeoffs and landings for fields without towers or after a small airport tower closes for the night.

3.) Flight Service Stations. No, you don't go to an FSS to gas up or get directions! Flight Service Station personnel handle weather briefings, file and close out flight plans, test and maintain navaids, and perform a myriad other duties, mostly for general aviation pilots. However, airline pilots contact FSSes and flight watch for weather information quite frequently.

Virgin Atlantic about to leave Jolly Old England; contributed by Carolyn Stone, Calif.

North Atlantic Routes

In response to many requests, here are the North Atlantic major world air route areas (MWARA) frequencies and the ground station locations that take their guard:

NAT-A: 3016, 5598, 13306, 17946 - Canarias, Gander, New York, Paramaribo, Piarco, Santa Maria, Shanwick (Shannon).
NAT-B: 2899, 5616, 8864, 13291, 17946 - Gander, Iceland, NewYork, Santa Maria, Shanwick.
NAT-C: 2862, 5649, 8879, 3306, 17946 - Gander, Iceland, Shannon.
NAT-D: 2971, 4675, 8891, 11279, 13291, 17946 - Bodo, Cambridge Bay, Churchill, Iqaluit, Gander, Iceland, Sondrestrom.
NAT-E: 2962, 6628, 8825, 11309, 13354 - New York, Santa Maria.
NAT-F: 3476, 6622, 8831, 13291 - Gander, Shanwick.

There's almost always a lot of action on these frequencies; also, many of these ground stations will verify a reception report.

Aero Topics in the News

Until recently, TWA has operated some of the industry's least fuel-efficient aircraft; however, they will be acquiring 10 new McDonnell Douglas MD-83 aircraft in addition to other aircraft ordered. The long term leasing arrangement for the new MD-83s provides for deliveries between June of 1998 and April 1999.

This brings to 15 the number of new MD-83s on firm order by TWA. The first delivery of these aircraft is planned for July 1997. TWA will utilize the aircraft to support planned schedule growth and the retirement of older jets. The new aircraft will be configured with 12 first-class seats and seating for 130 in coach-class. (TWA calls the latter "Comfort Class" and it's the first coach environment that's truly comfortable. - jb). By the end of 1997, TWA is expecting to add 24 more fuel-efficient new and used aircraft, mostly as replacements for older planes in its fleet. This will include eight Boeing 757-200s.

New Breed of ATC Equipment Emerges

In a joint acquisition by the FAA and the Defense Department, Raytheon Industries will supply new computers, displays, and software for up to 199 military and 172 FAA approach control and tower radar facilities. Installation is to begin in 1998.

Raytheon's Equipment Division will act as prime contractor for the standard automation replacement system, known as STARS.

The first system will become operational at Boston's TRACON facility as of December 1998. Tentatively, the final system will be installed in 2007.

Most of the automated radar terminal systems (known as ARTS) TRACON radars in use were custom-built and installed in the 1970s or early 1980s. Their software programs are too expensive to support, and they are incapable of meeting terminal area traffic growth into the next century.

However, the new system's hardware and much of the software are based on commercial specifications that allow more affordable upgrades as well as lower maintenance costs, resulting in the system being designed to accept additional capacity and functions without modification to the basic architecture.

The new radars will be capable of interconnecting with up to 16 other surveillance radars and can perform multi-sensor tracking to provide expanded and redundant coverage. Thanks to Ed Dunbar of Nebraska for contributing the above material.

That's all for this time. See you next month with more aero news and views. Until then, 73 and out.

John Fulford, WA4VPY
email: johnf@emi.net

FBI Found on 800 MHz....

If you have been following this column the past few months, the question of "where have the federal agencies gone?" has been the salient point. We are hearing no activity on 160 MHz channels where traffic should be, and we are starting to see federal vehicles with 800/900 MHz antennas on them—without their usual 160 MHz antennas.

It has long been rumored that federal agencies have been using commercial radio facilities up in the 800/900 MHz band. There was even an operation going on here in South Florida known as "Blue Halo," which used a wide area 800 MHz trunking system for their communications. This operation included units from county, state, and federal agencies. They were hiding up on a trunked system along with a hundred or so legitimate commercial businesses. Who would ever have have known to look for them up there?

It is reported that they are still operating, using a Motorola system located on one of the tallest buildings in downtown Miami, thereby giving complete South Florida coverage. By using their digital encryption, as many businesses are now doing, they are completely hidden.

Now for the first time comes a submission from a reader who wishes to remain anonymous—for obvious reasons. This reader, shall we say, would be "in the know." This submission is the allocation for the FBI in Brevard County, Florida, on 800 MHz.

While this list is dated 1994, it would be reasonable to suspect that the frequencies are still in use—or may have been expanded upon. Here are the frequencies.

866.xxxx					
.0750	.1250	.1875	.2125	.2500	.2625
.3250	.5500	.5875	.6250	.8250	
867.0375					
868.xxxx					
.0375	.1625	.3750	.4125	.5375	.5625
.6000	.6875	.7375	.7875	.8125	.8500

All of the frequencies are in MHz.

I ran the frequencies through the database and guess what I found? All of the frequencies come back licensed to County of Brevard—State of Florida. What a surprise. It seems that the FBI was, and still may be, using a fleet on the Brevard County 800 MHz trunked radio system.

What are fleets? Without going into a lot of detail on 800 trunking, no one frequency is assigned to a particular radio. The county sheriff could have his own fleet. In this fleet would be numerous subfleets—juvenile crime, detective division, internal affairs, etc. If your radio is not programmed to follow the particular information which is being sent out from the control channel, you will not hear the conversations.

For example, the county sheriff's radios could be structured so that the Sheriff had access to all of the sub-fleets. The detectives might have their own subfleet for their units plus the uniform patrol channel. Internal affairs would have their own subfleet that no one else could monitor, yet they would have access to detectives, patrol, etc.

Into this mix you can add other divisions of government—the county fire department could have their own fleet with possibly one or two subfleets; county government administration would have their own fleets for such agencies as animal control, code enforcement ... well, you get the idea.

It is entirely possible that the FBI has their own fleet up there hidden along with animal control, sheriff's patrol, etc. Only the people programming the radios and the actual agencies involved would know they even existed. The sheriff would never hear the FBI, but the FBI probably had (or has) the sheriff's fleet programmed into their radios for such operations as mutual aid, etc. The possibilities are unlimited.

Why stop at the FBI? Extend this scenario to other branches of the federal government. Who is to say that Customs does not have radios programmed onto Miami's 800 MHz trunked system? Why couldn't the Marshal's office have a fleet up there also?

I obtained a list of radio callsign prefixes for Metropolitan Dade County Florida. There were the usual callsigns for patrol, tactical, detective, vice, even internal affairs. What also was on the list were the callsigns for every federal agency in Miami, right down to the FBI, the Marshal's Office, even the units down at Homestead Air Force Base. Are these federal units sharing the main Dade County channels, or do they have their own fleets and subfleets on the Dade County system?

There's no reason to think Miami is the only metropolitan system to make use of such an arrangement. The new Motorola radios have the capacity for 256 fleets on them, with an unknown number of subfleets per fleet. What is to stop the Feds from programming their radios for every major city in the country that uses 800 MHz trunking? When they travel from city to city they would just have to change the knob on the radio to Miami, Atlanta, Los Angeles, etc. Besides these governmental 800 MHz systems, there often are commercial 800 MHz trunking systems in major cities. As you can see, the possibilities get very interesting.

What can we listeners do to monitor or even verify the presence of these transmissions? Unless you possess one of the Motorola radios that has been programmed to those fleets, you are out of luck. Motorola protects its programming software very carefully. Nor will owning a radio help you. Some change may be on the horizon with the introduction of Uniden's new trunk-tracking scanners, featured in this issue of *MT*. Stay tuned!

The Long Arm of the IRS

I had occasion last month to visit my local office of the Internal Revenue Service. It was a friendly visit and it turned out to be most informative. The IRS is composed of different parts. The one with which we are most familiar is the "audit and collection" division. There is another division whose attention you do not want to draw: the Criminal Investigative Division.

The local Criminal Investigative Division, or CID, has its offices in the main IRS office here in my fair city. This may also be true in yours. Look them up in the telephone directory: There will probably be a local address for the IRS, whereas the CID will just have a phone number. You can almost rest assured that they are in the same building.

While I was there, one of their "undercover" agents came out into the lobby to look for one of her associates. You could tell from the way she carried herself and by a certain "look" that this was a Fed, with a capital F. Besides, the fanny pack which held her gun, the alphanumeric pager, and the cell phone

sort of gave her away.

As I was leaving the IRS office, I decided to drive around behind the building. There, all parked in a neat little row, were all of their undercover vehicles. All low-slung new sedans with tinted windows. I saw our friend come out of the building with another agent and get into one of the vehicles—It was lunchtime and they were headed out for lunch. What attracted my attention was the 800 MHz antenna on the rear trunk lip.

Was this an 800 MHz antenna or a disguised 418 MHz antenna? There are several companies out there that manufacture antennas that look like commercial cellular antennas. Some antennas even extend down into the 27 MHz Citizen's Band and some cover the 30/50 MHz commercial band. I've always wondered how well their transmissions get out using a piece of wire the same physical dimension as a cellular and/or 800 MHz trunking antenna?

The question of antennas keeps recurring: Has the IRS also gone to 800 MHz to hide as mentioned above, or is this just a clever-looking 418 MHz antenna? I hear very little 418 MHz IRS traffic, and what I hear comes from Miami and Ft. Lauderdale.

The government generally does not do its own radio installation work. Is there someone at a radio shop who could—anonymously, of course—submit what he/she knows about the radios in the IRS vehicles and also information on the antennas? All submissions will be treated with the strictest confidence.

For what it is worth, here is a listing of the Internal Revenue Service Divisions and their corresponding radio channels.

IRS Criminal Investigative Division

Channel	Frequency	Use
01	418.2250	Simplex
02	418.2250	Repeater Output
	414.7000	Repeater Input
03	418.1750	Simplex
04	418.2000	Simplex
05	418.2250	Simplex
06	418.2250	Repeater Output
	414.7000	Repeater Input
07	418.2250	Repeater Output
	415.7250	Repeater Input
08	418.2250	Repeater Output
	415.0000	Repeater Input
09	418.1750	Repeater Output
	414.7000	Repeater Input
10	418.7250	Repeater Output
	415.7250	Repeater Input
11	418.1750	Simplex
12	418.2000	Simplex

The sub-audible tone is 3Z (123.0 Hz).

There was an old VHF system used for many years. It may still be in use in some areas by the CID. Here is that assignment.

Criminal Investigative Division

Channel	Frequency	Use
01	165.9500	Simplex
02	167.0000	Simplex
03	165.9500	Repeater Output
	167.0000	Repeater Input
04	166.4625	Treasury Commmon

The sub-audible tone is 1Z (100.0 Hz).

Office of the Inspector General

This division of the IRS conducts internal investigations and audits on its employees. It investigates employee misconduct and investigates threats made against IRS officials.

Channel	Frequency	Use
01	166.0000	Simplex
02	167.1000	Simplex
03	166.0000	Repeater Output
	167.1000	Repeater Input
04	166.4625	Treasury Common

There is no subaudible tone available.

I have heard agents from the Ft. Lauderdale/Miami field office using the 166.000 MHz frequency following their own CID agents around. All transmissions were in the clear—no scrambling. The repeater on 166.000 MHz could barely be heard up my way, but I did hear the input channel as well as the simplex operations.

Has anyone been checking out the 220/222 MHz band? There is a lot of activity there now. It is mostly trunking and uses ACSB (Amplitude Compatible Side Band) emissions. The antennas look like two meter (150 MHz) 5/8 wave gain whips with about half of the whip missing. Once you see one you will realize what it is. There are some exclusive federal government assignments there and remember—it is set up for trunking. Could we be seeing a repeat of the 800 MHz scenario there also? The questions mount ...

Ken Reitz, KS4ZR

Review of DBS Services

In the world of satellite television, one year is long enough to be considered an established success. Currently there are four direct broadcast satellite (DBS) services available to America's consumers, ranging from the six year old Primestar to the less than one year old AlphaStar, with the all-time popular DirecTV and lesser-known USSB also in the competition. This month we'll take a look at these services and you can determine for yourself which might be best for you.

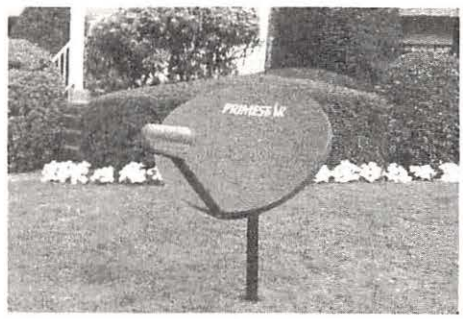
Unless you've been in exile on another planet for the last several years, your senses have been assaulted by the steady promotional campaign of the small dish revolution. The effect has been sensational. Direct broadcast satellite TV has truly become the hottest-selling electronic gadget in the meteoric history of electronic gadgets. But, once we've peeled away the hype, what's really the best deal? It takes a lot of sorting to come to any conclusions, but, considering the money you'll have to spend for this type of entertainment, your efforts will be worthwhile.

The first thing you should know is that whenever you hear the word "channel" these services are talking about video *and* audio. So, a service offering 100 channels might actually only have 50 or 60 video channels available. Whenyou visit showrooms and talk to dealers you should know that prices for the same systems vary widely from dealer to dealer. Shop around. Dealers are making a lot of money on peripherals and "add-ons." Installation kits can cost from $50 to $100 and may not even be necessary.

Big discounts are often given but only if you agree to sign up for programming totaling anywhere from $300 to $600 per year. Many salespeople are working on commission and the more they can add to your bill the better their monthly income. Also, dealers often get commissions from programmers for subscription sales for which they receive a residual income for years to come after the installation. I've calculated yearly costs, including installation and costs after five years of subscribing. Your actual cost may vary depending on what you subscribe to.

The most important thing to know, however, is that of the three DBS services available (DirecTV and USSB both use the DSS system), none of them are compatible with each other. In addition to the regular video services offered, all have pay-per-view movies and specials which typically cost $2.99 per movie to $30 and more for special events.

Primestar's Age Edge



Primestar's elliptical dish. (Courtesy Primestar)

Test marketing for Primestar began in November of 1990 using five analog (BMAC encrypted) channels on GE Americom's Satcom K1. The service quickly grew to nine channels and served 70,000 subscribers. By March of 1994 test marketing ended and the national rollout began. Less than two years later they had garnered more than one million subscribers. Currently Primestar serves 1.7 million customers and offers 95 channels.

Primestar has always soft-peddled the fact that their dish has been somewhat bigger (27 inches, required by the lower powered Ku-band satellite on which its programming has been transmitted). Its leap to the higher-powered bird will make it possible for Primestar to join the pizza-size crowd and takes the teeth out of one advantage over Primestar exploited by other services.

The biggest selling point going for Primestar is that subscribers are not required to purchase any receiving equipment. Installation is done by Primestar personnel and varies between $150 and $200, depending on your location, and usually takes just a few hours.

Primestar offers four programming packages ranging from their "PrimeValue" at $32.99 per month (just under $400 per year). This does not include The Weather Channel (TWC), considered a basic on most cable systems. To receive TWC you'll have to go to the next package, "Variety Tier," and kick in another $4.99 a month, bringing your yearly total to $455. Their next level is "Prime Entertainment," which includes all of PrimeValue and Variety and includes the Encore channels—Mystery, Westerns, and Starz—at $41.99 per month or $503 per year.

Their big ticket is "PrimeFamily," which includes all of the above plus three channels of HBO and two of Cinemax for $54.99 or a whopping $660 per year. Total cost for your first year with Primestar, assuming the lower installation charge: $810. Total charge for five years service: $3,450. Oh, by the way, that doesn't include any of the premium sports packages such as Major League Baseball's "Extra Innings" ($139) and the NBA "League Pass" ($149).

The DirecTV/USSB Twins

Known collectively as DSS (Digital Satellite System), these two competing services use the same satellites (DBS 1/2/3) and identical receiving equipment. Subscribers may choose one or both for their programming source. DirecTV is a child of Hughes Communications, which is a division General Mo-

Installing a Digital Satellite System. (Courtesy DirecTV)

tors so there are some deep pockets for them to plumb. USSB is the brainchild of Stanely Hubbard, whose Minneapolis based Hubbard Broadcasting has been a quiet force in terrestrial and satellite communications for the past twenty years.

USSB's program packages start cheaply enough. Their USSB Basics is only$7.95 per month but list only six channels, including the All News Channel (Hubbard's feeble answer to CNN Headline News). Emphasis at USSB is on movie channels HBO (5 channels), Showtime (3 channels), Cinemax (3 channels), and The Movie Channel (2 channels). Their USSB Entertainment Plus package is $34.95/month and they'll knock off $40 with an annual subscription ($379.40/year)—and still no Weather Channel. You'll have to go to DirecTV for that.

Sony DSS DBS satellite TV system. (Courtesy Sony)

DirecTV has six program packages which range from "Plus DirecTV" at $14.95 (16 channels of cable basics and 31 audio channels from Music Choice). But if you're looking for the Weather Channel you'll have to jump to "Select Choice" at $19.95 for 28 video and Music Choice channels. Their top package is "Total Choice Platinum" at $44.95, which includes virtually every entertainment and sports channel there is *except* HBO, Showtime, The Movie Channel, or Cinemax (you'll have to go to USSB for those). DirecTV also offers professional and college sports packages such as "NFL Sunday Ticket" ($159); "NBA League Pass" ($149); "NHL Center Ice" ($129); "MLB Extra Innings" ($139); "ESPN GamePlan College Football" ($79); and "ESPN Full Court College Basketball" ($79).

Their "Total Choice Platinum," less any movie channels, would be $540 per year. With a $200 basic system price tag and the $60 do-it-yourself installation kit, that would be $800 for the first year. Five years out, your total would be just under $3,000.

The DISH Option

Echostar Satellite Corporation launched its DISH (DIgital Sky Highway) service less than a year ago and wasted no time horning in on the DirecTV/USSB tiny dish lock. To get the public and their competitor's attention, they started off by selling their complete systems for just $200. This news sent shockwaves through the DBS industry and panicked DirecTV to do something it had never had to do before: compete. DirecTV/USSB retaliated with a similar offer and system prices have remained there since. Despite its frenetic ad campaign, featuring the obnoxious "Dishman" character, consumers were attracted by the hardware price and the program package prices which start as low as $10/month. The basic scheme at DISH is their "America's Top 40" basic service which costs $19.95/month and features 40 cable services, including The Weather Channel, Disney, and others considered premiums by other services. Ten more channels cost $24.99/month or $300 with a prepaid annual subscription.

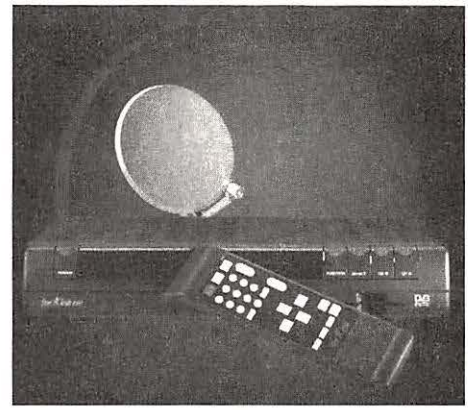
In addition, subscribers can choose from a wide variety of various networks and channels and pay *a la carte*. For example, their Spanish Language Package (Telemundo, Fox Sports Americas, and MTV Latino) is $4.99 extra. Movie channels HBO, and Cinemax are $15 to $25 per month extra. Their America's Top 50 with Premium Value Package (movie channels) would be $600 per year.

With basic system and one year subscription, your first year with dish would be $850, assuming self-installation. Five years with DISH and you will have spent $3,250. DISH charges $3.95 per month for its monthly guide *Dish Entertainment Magazine* (as a gracious gesture you get the first month free).

The AlphaStar Puzzle

Launched last year amid high hopes from parent company Tee-Com Electronics, Inc., longtime C-band satellite equipment manufacturer, AlphaStar, was to be distributed by the Amway Corporation, with its legions of highly energized sales people. Alphastar looked poised to charge into the DBS fray with effectiveness, but, the first six months saw a company in disarray. Following the pull-out of Amway and a lifeless promotional campaign AlphaStar had netted only a few thousand subscribers. Like the earlier Primestar, AlphaStar transmits on medium power Ku-band satellite Telstar 402.

AlphaStar offers two program packages, the "Basic Pak" at $24.99 per month and "100 Channels" for $49.99 per month. AlphaStar offers thirty channels of DMX (formerly known as Digital Music Express) as part of each package and counts in the per-channel count. The future looks quite uncertain for this DBS challenger. With no current system price available, as this was written, yearly charges can't be calculated.



AlphaStar DBS system. (Courtesy AlphaStar)

For More Information

Primestar is available throughout the U.S. at 1-800-PRIMESTAR or at many Radio Shack retail stores throughout the country. USSB receiving equipment and programming can be reached at 1-800-204-USSB. DirecTV satellite systems are available through numerous large retail chains and electronics store and can be reached at 1-800-DIRECTV. DISH satellite systems are sold through a vast network of independent satellite TV dealers. To find one in your area call 1-800-333-DISH. AlphaStar may be reached at their corporate headquarters in Stamford, Connecticut, at 1-203-359-8077.

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Electronic Design with a Spreadsheet

The Information Age unleashed monumental changes into our lives, the most profound of which might be new and improved learning tools. Human learning isn't fully grasped even by the experts, but it is generally agreed that trial and error (repetition) are key ingredients. In other words, do something long enough, and get the right feedback, and you're bound to learn!

But with improved tools, there's a faster way ... I am pleased to offer, with a twist, a time-honored trial and error process for the design of a low noise, high gain transistor preamplifier, except that the trial and error phase is reduced to seconds instead of hours or days. You need only a hobbyist's grasp of soldering and circuit building.

Experts and students alike can design and build a tape recorder or microphone preamplifier to hear ants partying in the carpet or college professors mumbling across lecture halls. A computer and a spreadsheet crunch out optimized designs. You'll have an important electronics learning tool, because the spreadsheet does all the trial, freeing you to learn the concepts.

If you don't have a computer and spreadsheet, a calculator produces the same results; it just takes longer ... the old way.

The Circuit

The common emitter is a basic building block for bipolar transistor circuits, offering high voltage gain (amplification), excellent noise immunity, good impedance transfer characteristics, and simplicity. A practical example of a common-emitter is an audio preamplifier for tape recorders, stereo sources, radio detectors, and microphones, especially for Radio Shack's electret mics, #33-3003, #33-3013, or even #270-090 or #270-092.

The circuit includes a 2N3904 low noise transistor and a few resistors and capacitors. Add a battery, input/output jacks (and cables), for a low cost performer and lots of fun.

The Design Approach

Any of several variables in preamp design can alter circuit values enough to make this a formidable magazine article. Variables include power supply type and voltage, output impedance of the signal source to be amplified, input impedance of what the preamplifier is to feed, and the type of amplifying transistor to be used. Pick these first, plug in the data, and the spreadsheet does most of my work, calculating component values and circuit parameters for you.

If you don't have a spreadsheet or computer, just list the data from Figures 1 and 2, cells B3-B10 and use a calculator to perform the math in Figure 2, cells B12-B27.

Getting Started

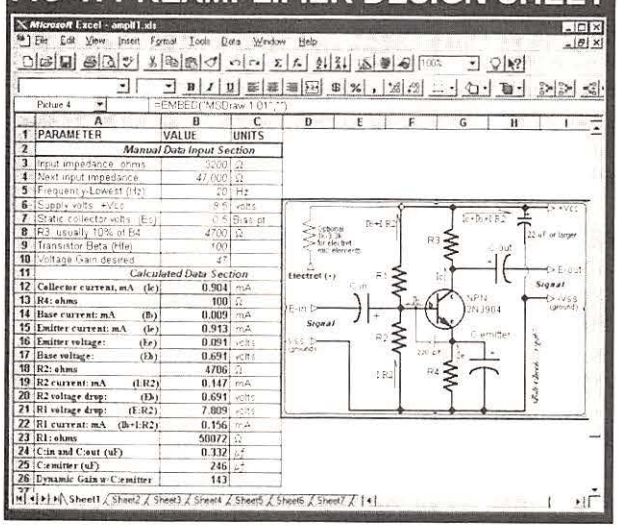
You need to know the output impedance of the signal source to be amplified. This is found in the specs for the source. For example, microphones are typically "low impedance," with values ranging from 450-5000 ohms, but 600-1000 ohms is fairly standard. Referring to Figures 1 and 2, enter this output impedance value (ohms) in cell B3. Good design calls for the input impedance of the preamp to match the output impedance of the source. So if you want a microphone preamp, and the output impedance of the mic is 1000 ohms, then enter 1000 in cell B3. (My example project needed an input impedance of 3200 ohms.)

Next is the input impedance of the device or circuit that will be fed by the preamp. Typically, the input impedance of an intermediate amplifier is rather high, in the range of 25k-100k ohms. My design called for 47k ohms, so I entered 47000 in cell B4. If you absolutely don't know your required value, 47000 is always a good trial entry for cell B4.

The lowest frequency to be amplified goes in cell B5. Good bass response calls for 20 Hz, so I entered "20" in cell B5. What kind and source of power will run your preamp? I selected a 9-volt battery, but wanted performance to improve as the battery ran down, so I selected 8.5-volts for cell B6, rationalizing that 8-volts is about the end of life for a 9-volt battery. This mid-life optimization ensures good performance over the life of the battery.

The data for cell B7 really isn't a variable for preamplifiers. It's a DC "bias" point for the transistor when there is no signal input. It's possible for the transistor's collector voltage to run anywhere between 0-volts and +Vcc, but if near either extreme, the output signal will be distorted. Therefore, to ensure low distortion, the transistor must statically run at a point midway (Class A) between 0 and the supply voltage. Entering ".5" in cell

FIG-1: PREAMPLIFIER DESIGN SHEET



	A	B	C
1	PARAMETER	VALUE	UNITS
2		*Manual Data Input Section*	
3	Input impedance, ohms	3200	Ω
4	Next input impedance	47,000	Ω
5	Frequency-Lowest (Hz)	20	Hz
6	Supply volts +Vcc	8.5	volts
7	Static collector volts (Ec)	0.5	Bias pt
8	R3: usually 10% of B4	4700	Ω
9	Transistor Beta (Hfe)	100	
10	Voltage Gain desired	47	
11		*Calculated Data Section*	
12	Collector current, mA (Ic)	0.904	mA
13	R4: ohms	100	Ω
14	Base current: mA (Ib)	0.009	mA
15	Emitter current: mA (Ie)	0.913	mA
16	Emitter voltage: (Ee)	0.091	volts
17	Base voltage: (Eb)	0.691	volts
18	R2: ohms	4706	Ω
19	R2 current: mA (I:R2)	0.147	mA
20	R2 voltage drop: (Eb)	0.691	volts
21	R1 voltage drop: (E:R2)	7.809	volts
22	R1 current: mA (Ib+I:R2)	0.156	mA
23	R1: ohms	50072	Ω
24	C:in and C:out (uF)	0.332	µf
25	C:emitter (uF)	246	µf
26	Dynamic Gain w/C:emitter	143	

FIG-2: FORMULA SHEET

	A	B	C
1	PARAMETER	VALUE	UNITS
2		*Manual Data Input Section*	
3	Input impedance, ohms	3200	Ω
4	Next input impedance	47000	Ω
5	Frequency-Lowest (Hz)	20	Hz
6	Supply volts +Vcc	8.5	volts
7	Static collector volts (Ec)	0.5	Bias pt
8	R3: usually 10% of B4	4700	Ω
9	Transistor Beta (Hfe)	100	
10	Voltage Gain desired	47	
11		*Calculated Data Section*	
12	Collector current, mA (Ic)	=1000*(B7*B6)/B8	mA
13	R4: ohms	=B8/B10	Ω
14	Base current: mA (Ib)	=B12/B9	mA
15	Emitter current: mA (Ie)	=B12+B14	mA
16	Emitter voltage: (Ee)	=(B15*B13)/1000	volts
17	Base voltage: (Eb)	=B16+0.6	volts
18	R2: ohms	=(B3*B13*B9)/((B13*B9)-B3)	Ω
19	R2 current: mA (I:R2)	=(B17/B18)*1000	mA
20	R2 voltage drop: (Eb)	=B17	volts
21	R1 voltage drop: (E:R2)	=B6-B17	volts
22	R1 current: mA (Ib+I:R2)	=B19+B14	mA
23	R1: ohms	=1000*B21/B22	Ω
24	C:in and C:out (uF)	=1000000/(3.2*B5*B4)	µf
25	C:emitter (uF)	=1000/(6.2*B5*(0.03/B15))	µf
26	Dynamic Gain w/C:emitter	=(B8*B15/0.03)/1000	

B7 converts to "50%" elsewhere in the calculations. Don't worry if you don't understand why; always enter .5 in cell B7 for amplifier circuits.

Cell B8 is an arbitrary value of R3, which we choose based on a percentage of the input impedance of the next stage (see cell B4). Good preamplifier design calls for the value of R3 to be about 10 percent of the input impedance of the next stage, so 10 percent of 47000 (B4) is 4700. Enter 4700 in cell B8.

Now select your transistor. I chose the 2N3904 for its availability, low noise, and good amplifying characteristics. The only formal spec needed is the "H_{fe}," a measure of the transistor's current amplifying capability. This number isn't too important so long as it's 100 or greater. H_{fe} of the 2N3904 is specified to be a minimum of 100 and a maximum of 400. I entered "100" in cell B9 to be ultraconservative.

The fun is about to begin. Decide on the minimum signal gain you need. In my application, the input source puts out about 2-mV (0.002v) but the next stage needs 100-mV (50). I entered "47" into cell B10 as a compromise to simplify the design as we'll see in a moment.

The Calculations

Enter the formulas into cells B12-B27 exactly as shown in Figure 2. Cell B12 performs the first calculation for the transistor's collector current. At less than 1-mA, it proves eminently acceptable. Cell B13 calculates the value of R4, based on the value of R3 divided by the desired voltage gain entered into cell B10 (4700 ohms/47=100 ohms, a common resistor value). Now you see why I chose "47" for my minimum desired voltage gain.

In the interests of brevity, I'll dispense with explaining the rest of the calculations (which you can figure out with a little study) and instead call your attention to cells B18, B23, and B25 where the values of the rest of the circuit components are calculated and displayed. In my example, R2 is 4706 ohms (we'll use the common value, 4700 ohms). Cell B23 calculates 50072 ohms for R1, not a common value, but we can get close enough with common 47k ohm and 3.3k ohm resistors wired in series.

Values of input and output coupling capacitors (Ci and Co) are calculated to be .332-µF, for which the common 0.33-µF is perfect, but since tantalum capacitors are better for low noise, low leakage, and good high frequency characteristics, it is acceptable to use the available .5-µF or 1.0-µF values. You'll just have better bass response than originally specified.

Enhanced Design

Once the design is tried and adjusted to common value components, the addition of two more can improve performance. An emitter bypass capacitor (Ce) greatly improves circuit gain without altering the safety or bias points. Cell B26 calculates an optimum value for Ce to be 246-µF, a bit hefty for a microcircuit, but anything in the range of 22-µF and up will give improved bass response and more gain. Depending on need, Ce is optional, but it provides so much for so little that it just makes sense to use it. You can test your prototype with and without it to see what I mean.

Not calculated in the spreadsheet, but in the schematic is C1, a 220-pF capacitor connected across the transistor's emitter and base. C1 isn't strictly needed, but is an elegant touch to protect the transistor's bias from RF, spikes, and transients. Also not on the spreadsheet is the optional impedance matching feed resistor (Rx) for electret microphones. Some need it; some don't. Check the specs of your electret mic element. Usually a 1k ohm resistor is specified, but values to 3.3k ohms are possible. By the way, the value of this resistor sets the output impedance of the electret as needed in Cell B3.

Last, but not in the calculations, is a bypass decoupling capacitor (C2) for the +Vcc power supply line to ground. This can be an electrolytic capacitor of about 22-µF or larger.

Wrapup

I could write a book on amplifier design and bore you to tears. Or, you can play with this spreadsheet; change a few values here and there in cells B3-B10 for instant results; and perhaps learn more in less time than from a dry old book. Build your spreadsheet exactly as shown in Figure 2, column B. Columns A and C are just descriptive text and can be reworded or annotated to suit your needs.

Hints: (1) Figure 3 is the perfboard layout for the prototype. (2) Try a design using tiny mercury or lithium cells as a +3-volt supply. Use 2.90-volt as the design center. (3) After your design proves up, build it with surface-mount components into a minuscule module!

There isn't anything hairy about the formulas. Type them as shown into any spreadsheet program. If you follow the formulas with a calculator, use standard algebraic rules for working with parentheses.

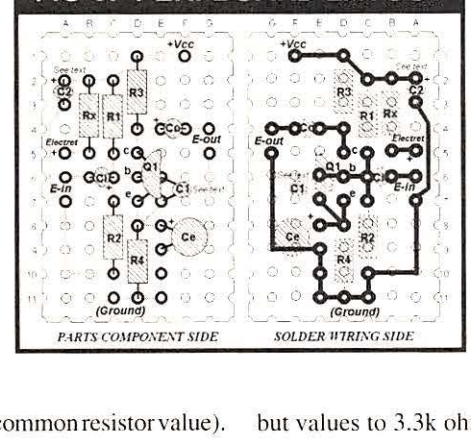
Striking a blow for rhyme and reason, I annotated the schematic in Figure 1 with arrows to signify direction of electron flow. Engineering professors will gasp and clutch their hearts since they now teach a theory with arrows pointed opposite mine. They call it "current flow." Um-m-m, okay, but when I water my garden, water flows out the end of the hose to the soil, not the other way around. Theories aside, my arrows show the direction of electron flow in the circuit.

I have combined the Excel spreadsheet for this project with the file that contains other spreadsheets from past Experimenter's Workshop articles and have made it available on my BBS (619) 578-9247 in the free download area and on my FTP site, **ftp://ftp.cts.com/pub/bcheek**. The filename is SPRED1.ZIP

So tell me: how do you like working with spreadsheets and databases so far?

E-mail: bcheek@cts.com
WWW: http://ourworld.compuserve.com/homepages/bcheek
FTP: ftp://ftp.cts.com/pub/bcheek
BBS and FAX: (619) 578-9247 4:30 p.m.-12:30 p.m. PST

FIG-3: PERFBOARD LAYOUT



John Catalano, PhD
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The Pick of Top Decoders

A decoder connects to the speaker/record output of your receiver. It takes the audio of radioteletype (RTTY), FAX, AMTOR, Packet, and other digitally encoded forms of signal modulation, and decodes, or translates, them into letters and numbers.

Now, let's get one thing straight up front. When we say *decode* we do not imply that plain language, readable text results. The text may have been encoded with a "secret" language before it was transmitted. For example, assume a message was sent in French as a RTTY signal. A working digital signal decoder would show letters on a computer screen. However, to understand what the message said we would have to know the message's original language. In our example it would be French. Therefore, if the signal modulation can be decoded, it does not guarantee that the message is being sent in an internationally recognized language. The sender may not want Joe Monitor to read his "mail." In practice, the majority of the HF signals will be encrypted, either by a unique modulation method, secret language, or both.

Heavy on Hardware

Decoders come in a number of forms. They range from decoders which are 90 percent software and 10 percent hardware, to ones which are just the opposite: 90 percent self-contained hardware and 10 percent software. An example of the second type is the famous AEA PK-232.

The PK-232 is a hardware decoding system. It contains audio filter circuits, a microprocessor, and decoding programs stored in a read only memory (ROM). The decoded output is sent to your computer for display via the RS-232, standard serial port. Hence the origin of the PK-232's name. The user also sends control instructions to the decoder by the serial connection. The advantage of this approach is that the user's computer is not being tied up in the decoding process and is free to do other things, such as run a receiver controller program and database.

The PK-232 decoders are some of the easiest to use in the hardware intensive category. The signal is tuned via a number of LEDs on the PK's front panel, for maximum left and right deflection. Then, by typing "SI", the PK-232 attempts to identify the signal automatically. The SI function works well for the identification of simple digital modes.

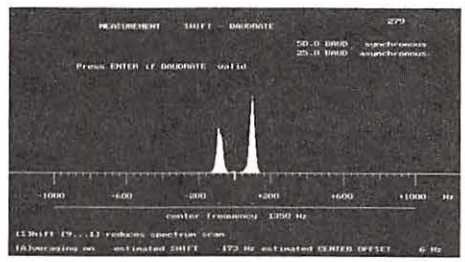


FIGURE 2 - *Code 3 Gold Tuning Screen*

With ROM upgrades from the manufacturer, AEA, the latest PK-232s decode all forms of ham radio modes, both HF and VHF/UHF. Navtex, ARQ, FEC, and a few more are included. In addition, the latest PK-232 includes a position reporting function which allows the user's Global Position Satellite (GPS) receiver output to be automatically encoded and decoded on signals. This gives real time station position information, even if it's mobile.

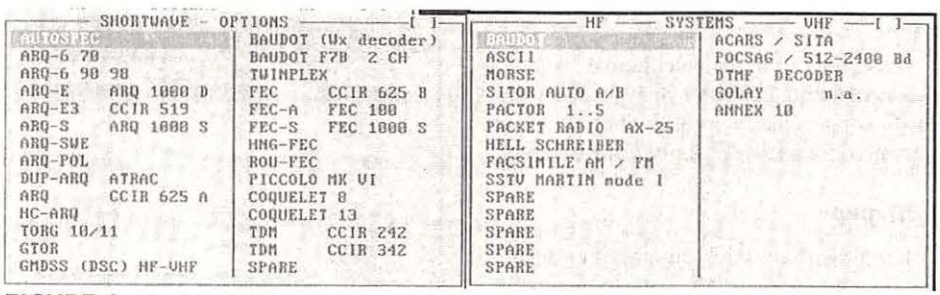


FIGURE 1 - *Code 3 Gold Mode Screens*

FIGURE 3 - *Code 3 Gold Mode Determination*

Software Based Decoders

We said the value of a hardware based decoder was that it did not tie up your computer's processor. That's the good part. On the other hand, nowadays PC processors are very, very powerful. The best software-based decoders can exploit this power capability by providing many more decoding features: automatic signal analysis, audio/digital level display, cataloging of signals, plain language decoding in various languages, and even secondary decoding levels. We'll see an example of secondary decoding in a minute.

The down side of software-based decoding is the limited amount and effectiveness of its input signal conditioning. This conditioning converts audio to digital logic levels readable by the computer. Due to the small amount of circuit hardware in the software-based decoder, all hardware, including signal conditioning, is minimized.

Counter-balancing this limitation is the software-based decoder's ability to add new features and decode modes via a simple software upload, be it from disk or even the Internet. The Code 3 Gold is one of the most sophisticated of these software-based decoders available today.

Code 3 Gold

We have used and reported in this column on the whole "Code" family of decoders, from the Granddaddy of the product family, Code 30, to the Code 3 and now the Gold version. We have operated them all. The Code 30 comes in the form of a PC expansion card, does just about everything a decoder can do, and will set you back more than a Grand ($1000). The Code 3 comes with a 4-by-7-

inch plastic circuit box which is attached to 110/220 VAC, receiver audio, and the serial port. The Code 3 only decodes those modes used in the shortwave spectrum.

Now we have the Code 3 Gold, which decodes both shortwave and VHF/UHF signals. Figure 1, which is a screen shot from the program, shows all the modes decodable by Code 3 Gold. Note that there is now a mode screen with the top title of "VHF" which was not present in the Code 3 version. The VHF modes include ACARS for airline monitors, DTMF (telephone keyboard decoding), and other "interesting" modes.

The only hardware that comes with the Code 3 Gold is a cable that connects the serial port of the computer to the receiver's audio. The shell of the serial port connector houses the simple, but effective, circuit elements, which allow the software to perform its magic. The circuit's power comes from the serial port. Therefore, no additional connections are required. You must have a 486 PCwith a minimum clock frequency of 33 MHz and VGA/SVGA display capability.

Soft or Hard Results?

Figure 2 shows what I call Gold's "receiver tuning screen." Here you can clearly see the two tones of the signal represented by the two peaks. Once you have tuned your receiver to obtain screen centered peaks, all you need to do is to press the enter key. Code 3 Gold takes over from here; it determines the baud rate of the signal. Then it switches to Figure 3 where it considers and displays the possible modes.

Finally, if all goes right, the bottom of the screen jumps to life displaying the probability of success of its mode selection. This takes about 10 seconds, during which time you can watch the confidence level measurement increase, if Gold has guessed correctly. Again, automatically, and without user intervention, if the confidence level goes up Code 3 Gold switches to the decode screen, Figure 4. One keystroke decoding is here!

Since we are doing an overview of the Best-of-the-Best, we will not go into the many other features and capabilities of Code 3 Gold. However, I do want to mention that Code 3 Gold is capable of secondary decoding of meteo synop weather messages. These messages come in a number of forms, including groups of five characters. Using Code 3 Gold, the receiver signal can not only be decoded into these characters, but they are then converted into plain language weather reports. The feature is very nicely implemented and easy to use.

Be Careful of the Setup!

The things to watch out for when using Code 3 Gold have to do with the initial installation/setup of the program and setting the audio levels. The program comes on one high density 3.5 inch disk. When I tried installing the software I had erratic operation. The only way I could obtain reliable Code 3 Gold operation was to remove my virus checker and memory manager (QEMM). The other thing to watch out for is setting the audio level coming from the receiver. Check the "ADLevel Scope" on the Analysis Menu to set the level.

The Code 3 Gold deserves to be among the Best-of-the-Best. It is available from Computer Aided Technologies, the Scancat people. Its price ranges from $425 to $595, depending on the options ordered. Check out their *MT* ad and web site at **http://www.scancat.com.** Their order telephone number is (318) 636-1234.

Don't Forget HamComm!

We couldn't close this column without mentioning HamComm 3.0—one of the best and cheapest of decoders. Any 286 or better PC will run it. All the basic HF modes are decoded. It also does synop weather decoding and translation into plain language. The software includes an instruction manual file and details on building the required simple hardware interface. A number of ready-built interfaces can be used including JVFAX, PKTMON, EasyFax, and others.

Hamcomm 3.0 works very well and is an inexpensive way to give decoding a serious try. The software costs $30. But remember, you have to build or buy the interface. This cost can run from $7 to $50. Contact DL5YEC via his E-Mail site, **DL5YEC@DB0BQ.DEU.EU** for ordering information. A mailing address is listed as: W.F. Schroeder, Augsburger Weg 63, D-33102 Paderborn, Germany.

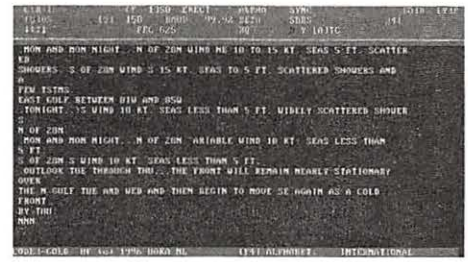


FIGURE 4 - *Code 3 Gold Decoding Screen*

Wrap-up

Well, there you have it, in my opinion, the Best-of-the-Best, ... at least for now. Next month we'll try more radio-related Internet web sites that you have E-mailed to me and lots more new monitoring software.

Rich Arland, K7SZ
k7yha@juno.com

Simple Antenna Solutions

I trust Santa left you some good radio "stuff" during his annual trek around the world; I know he did a splendid job at K7SZ. As you see, my ham radio vanity callsign, K7SZ, arrived—along with a pristine Hallicrafters SX-117 receiver and matching HT-44 transmitter.

This column will focus on antennas. We all know that antennas are the pivotal point in our radio shacks, whether we are pursuing ham radio, shortwave DXing, general listening, or scanning. If you do not have a good system antenna, you are missing out on a lot of action and fun.

Notice I said "system." In reality, you must treat your antenna(s) as a system and apply some system architecture when designing them. While it is desirable to erect a large wire or series of wires high in the air, the reality of today's housing situation often dictates that the radio hobbyist must be content with smaller, less efficient, ofttimes indoor antennas.

In order to adopt a system approach to our humble antenna farm we are going to resort to computer modeling. One piece of software worth its weight in gold is ELNEC antenna modeling software by Roy Lewallen, W7EL.[1] Roy developed the original ELNEC several years ago, and EZNEC is its latest evolution. The primary difference is speed, with EZNEC being designed to work on a 486/586 or Pentium processor (with math co-processor included). ELNEC will still give a good account of itself for those of us who use 286/386s. Both programs feature an extremely user friendly environment.

Exactly what can ELNEC or EZNEC do for us? Darn near everything but pull the wire into the trees! Using either of these programs, you can model almost any antenna configuration imaginable and have an idea of how it will perform *prior* to actually building and erecting the antenna. After surveying your location or property, it is a simple matter to start laying out your antenna needs via ELNEC/EZNEC. The results will tell you how the antenna system will work, and if the wires will interfere with each other.

CASE #1: A hot topic on one of the internet lists I subscribe to was the use of rain gutters as an antenna. By taking the physical dimensions of your rain gutters and downspouts and cranking these into antenna modeling software, you can obtain an idea of how these proposed antennas will work in the real world.

Let me inject a word of caution: When you use rain gutters as *transmitting* antennas, remember that extremely high RF voltages can appear at various points along the antenna. You *must* reduce your transmitting power down to 10 or 25 watts output to ensure that you don't start a fire or fry some siding. Having been involved in low power (QRP) ham radio for the last 30+ years, I can state with some authority that 10-25 watts is more than enough RF power to work the world reliably. Obviously, the longwave, shortwave DXer, and scannist need not worry about this aspect of hidden antennas.

The MFJ 259 antenna analyzer/MFJ-66 dip meter combo

CASE #2: My neighbor, David, and his wife are both radio amateurs. He wants a couple of decent antennas in the air and his wife says "*No*!" What should he do? ELNEC comes to the rescue. Dave's fertile mind came up with an idea of laying #12 AWG 110 volt AC house wire along the eves and sofits when he re-roofed his house. Using ELNEC, Dave modeled not one, but two HF antennas for his shack. The plots obtained from computer modeling accurately depicted good performance on 40 through 10 meters including all the WARC bands. The result: no antennas anywhere in sight, Dave has achieved his goal, and his wife still speaks to him!

CASE #3: One well-known radio hobby columnist recently recounted his efforts to erect a small 6 and 2 meter stack for VHF DXing. Living in suburbia, he couldn't erect a set of huge long-boom Yagis due to zoning restrictions and objections from his neighbors. So, using antenna modeling software, this enterprising ham redesigned two commercial antennas to fit his needs. The result: a set of five-element two-meter beams between a set of three-element six-meter beams, all on one mast, turned by a single rotor. He now enjoys weak-signal VHF DXing with antennas only slightly larger than most TV arrays.

CASE #4: My wife, Tricia, had been after me to install a clothesline from our second-floor back porch 75 feet across the yard to a pole adjoining our neighbor's property. Total height: 25 feet. I surprised Tricia by eagerly erecting a clothesline in record time. The clothesline was steel wire with a plastic coating, routed through two pulleys (one at each end) to facilitate hanging the clothes. I removed about one inch of plastic insulation from one side of the clothesline loop and connected a 15 foot wire jumper from the shack. I now have a 150 foot end-fed wire open loop antenna for SW listening and Tricia has her clothesline.

Yes, I did model this via ELNEC, and while it is of little value for transmitting, it certainly works well for receiving. So well, in fact, that before I had built the antenna changeover relays for my vintage Hallicrafters SX-117/HT-44 HF ham station, I used the clothesline antenna for the receiver and connected the transmitter to the 80 meter Zepp antenna. This system worked fine for two months, allowing me to work some really good DX on 40 and 80 meters and also check into the Boatanchor Net on 3597 kHz nightly.

While the preceding examples dealt primarily with ham radio, you can press computer modeling software into service to design longwave and shortwave wire antennas and VHF/UHF scanner beams. As you can see, it is relatively simple to preplan your antenna system to maximize the results using computer modeling.

Longwave and shortwave DXers and listeners actually have an advantage over the ham radio operator when it comes to antennas. Most of today's receivers respond very well to short wire antennas and/or indoor antennas.

Activate Your Antenna

One word about "active" antennas. This special breed of antenna is designed exclu-

sively for limited space use where it is difficult or impossible to erect an outside antenna. The *real* purpose behind an active antenna is not to provide gain but to match impedances. The vertical whip or sort dipole associated with an active antenna is not resonant at any HF frequency. The internal workings of the active antenna provide an impedance match between this short antenna and the receiver at HF. Gain is a factor, but it is not the real reason true active antennas work.

Over the last few years, the industry has marketed several "active" antennas that are nothing more than wide-band RF amplifiers. Raw RF gain is not the solution to the problem. A wide-band RF amplifier serves to inject large amounts of noise into the receiver. While the overall signal strength of the target station may increase, so does the accompanying noise level. Hence, you gain nothing. As a matter of fact, you actually lose receiver performance by injecting wide-band noise into the front end of the radio. Take a lesson from the VHF/UHF weak signal crowd: reduce the noise entering the system and you will have a much "hotter" receiving system.

Other Tools of the Trade

So far we have dealt with preplanning and designing our antenna system. When it comes time to pull some wire, there are a couple of handy tools you might want employ. **Antenna analyzers** have been around for a few years and have evolved into very useful pieces of test gear. Last June I traveled to the San Gabriel Mountains just outside Los Angeles, for a QRP Field Day with the Zuni Loop QRP Expeditionary Force. Watching some of the Zunis quickly prune our antennas to proper operating frequency using the MFJ-259 HF/VHF antenna analyzer,[2] prompted me to purchase one as soon as I arrived back home.

The MFJ-259 allows you to prune antennas to exact frequency and minimum SWR between 1.8 and 170 MHz, via a built-in ten-digit LCD, 170 MHz frequency counter and associated RF oscillator, and two analog meters—one for SWR and the other for direct impedance readout. It is much easier to see the tuning process with an analog meter than watching digits flip on a digital display.

The MFJ-259 also includes circuitry that enables you to use the analyzer as a stand-alone 170 MHz counter. In addition, it can be carried up the tower or onto the roof for feedpoint impedance and resonance measurements.

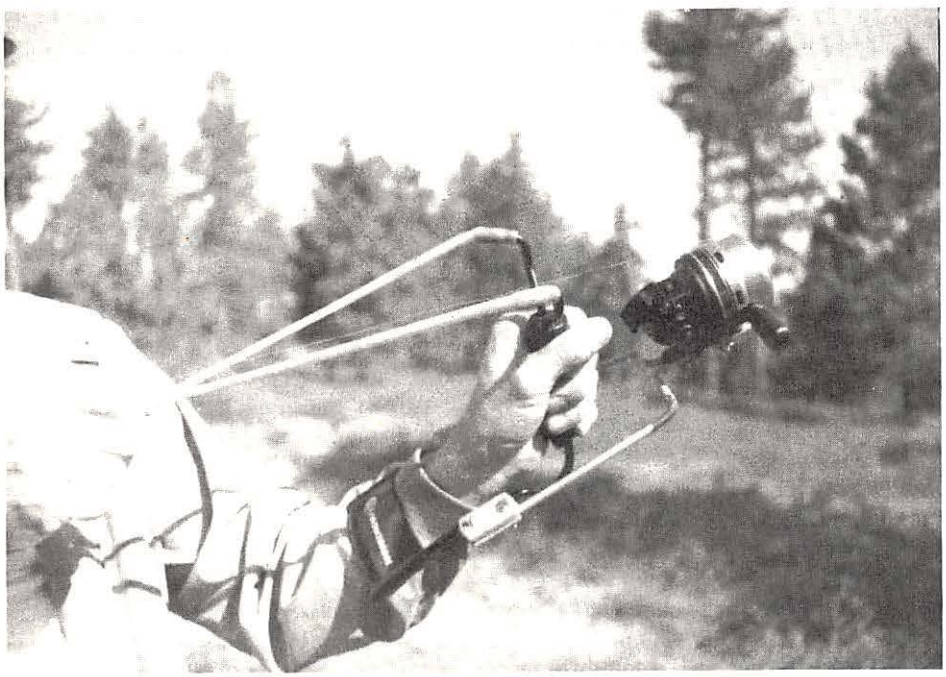
To protect your new analyzer I highly recommend buying the MFJ-29B tote pouch with clear plastic windows for the display and analog meters. The optional MFJ-66 dip meter accessory turns the analyzer into an accurate band-switched dip meter for winding coils, checking capacitance and inductance, and measuring velocity factor and electrical lengths of coaxial cables and phasing lines. The MFJ-259 HF/VHF antenna analyzer is an extremely useful tool and is well worth its $239.95 price tag.

OK, you're on the ground, the tree limb from which you want to hang the end of the antenna is about 65 or 75 feet in the air; now what do you do? Try the "Zuni-Loop Anti-gravity Device": i.e., a modified slingshot with closed face spinning reel attached. These things are great for getting the ends of wires into high trees. Unfortunately, no one currently markets this device so you'll have to build your own, but it's worth the effort, even if you use it only once or twice a year. (*Look for a simple construction article in an upcoming spring "antenna issue"- ed.*)

In the past I have used a bow and arrow, fishing pole and reel, weights tied onto "special" nylon line, and a totally useless device called "The Quick Launch System" to get the ends of my antennas off the ground. *Nothing* beats the slingshot/spinning reel combo. The first shot sends a 3/4 ounce fishing weight on 10 pound monofilament fishing line over the desired tree limb. After the weight reaches the ground, a light duty nylon line is attached and reeled back over the tree limb. This is detached and the antenna rope or end of the antenna is then attached to the light duty line and pulled into the tree. That's all there is to it. Simple, quick, deadly accurate, and amazingly easy to use.

NOTE: If you write me, please include an SASE if you wish a reply. The best way to contact me is via e-mail: *k7yha@juno.com*, but be sure to include *KIS RADIO* in the subject line to ensure I don't delete your message without reading it.

That's it for this column. Now go out there and get some wire into the air and enjoy some real DXing. Till next time, Keep It Simple.



A close-up look at the "Zuni Loop Anti-Gravity Device"—consistently accurate to about 80 feet.

[1] ELNEC & EZNEC are registered trademarks of W7EL Software available from Roy Lewallen, W7EL, P.O. Box 6658, Beaverton, OR 97007.
[2] MFJ Enterprises, Box 494, Mississippi State, MS 39762 Tel: (800) 647-1800 Fax: (601) 323-6551

MT REVIEW

Darcy Shortwave Booster

By Bob Grove

Operating from roughly 200 kHz through 40 MHz, the Darcy Shortwave Booster is a combination active antenna/preselector targeted toward shortwave listeners who haven't enough room for an outside wire antenna. Obviously hand made, it is tempting to call the Darcy booster an "ugly duckling," but its performance exceeds its appearance by a considerable margin, and its price is lower than competitive units.

Enclosed in a plastic project box, its 30 inch telescopic whip may be extended for tabletop convenience, or a random wire may be attached under a spring (Fahnstock) clip; a similar grounding clip is also provided. A nine-volt battery is held by an external bracket, and a short, shielded cable is terminated with a 1/8 inch (3.5 mm) mini plug to mate with

shortwave radios which utilize that size jack for external antenna attachment. The instructions advise cutting off this plug for use with other connectors.

The two-transistor amplifier provides roughly 12-15 dB gain over the application range, and selectivity is quite sharp. Unfortunately the 12 position bandswitch has no calibrations, so proper selection is hit and miss. A mediumwave high-pass filter may be switched in to diminish broadcast band interference.

Users may object to the crudeness of the unit with its typed gummed labels and uncalibrated controls, but the unit is relatively intuitive to use once you figure it out, and its sharp selectivity does help draw the weak ones out of the mire. Instructions are included.

$64.95 plus $8 shipping from Darcy Jabs, RR 2, Burns Lake, BC, CanadaVOJ 1EO; ph. 250-694-3760; or email *djabs@awinc.com*.

Alinco HTs: Simple and affordable

Steve Donnell, WA1YKL

Alinco Electronics has introduced a new miniature, low power, UHF FM transceiver. Measuring only 2.2 inches by 4 inches by 1.1 inches and featuring a flip-up rubber antenna, the DJ-S41 may be the perfect choice as a portable that can easily slip into your pocket or purse. While the DJ-S41 is intended for amateur band use, covering only the 420-450 MHz band, a simple "remove the jumper" type modification will open the frequency programming of the 'S41 to cover 400 - 500 MHz (although the actual synthesizer "lock" range on the unit that we got covers from about 425 - 490 MHz).

Receive sensitivity above the ham band is very good, making it a great UHF band monitor. While transmit output power for the 'S41 is rated at only 340 mW, this easily permits short range direct frequency contacts or access to most local repeaters.

Compared with other ham band portables, the DJ-S41 is a major departure from the norm, where each new radio seems to be crammed with more and more bells and whistles. The features offered in the 'S41 are rather "Spartan" though you do get 21 memories that can be can be set up for any frequency, any transmit offset, and any standard CTCSS tone (encode only), and the memory channels can be scanned. There is, however, no priority function nor even any memory "lockouts."

The 'S41 does offer some basic features such as LCD backlighting, keyboard lock, bar graph S meter, along with provisions for external speaker, microphone, and DC power. Alinco is reportedly working on an updated version of the 'S41 that will include CTCSS decoding as a standard or optional feature. Battery power for the 'S41 is supplied through three AA batteries. Ni-Cd batteries can be used but require the use of a charging stand.

The DJ-S41 is available from most ham radio dealers for a surprisingly low price of about $140, making it the lowest-priced FM voice, non-kit radio on the amateur market today. The 'S41 is a great choice for any ham, young or old, on a budget. Or for anyone looking for a simple-to-use UHF band portable.

Given the simplicity and low cost of the 'S41, it comes as no surprise that Alinco plans to introduce a very similar unit, intended for use in the new Family Radio Service. It is expected that this new model will be preprogrammed to operate only on the fourteen 462 - 467 MHz frequencies assigned to the FRS. The new FRS Alinco radio will be available sometime in March.

One of the DJ-S41's features that we did find interesting is its "bell" function. With the "bell" activated, if the radio receives a signal, the speaker will emit a series of "ring-ring" beeps that closely resemble an incoming call for a cellular phone. Beam me up Scotty....

WHAT'S NEW?

PRODUCTS AND BOOKS OF INTEREST TO THE RADIO HOBBYIST

by Larry Miller

Guest Reviewers: Rachel Baughn, Bob Grove, Gayle Van Horn, Dan Veeneman

Shortwave Skymatch

We've all heard the nightmarish stories about the neighbor who doesn't like antennas and drags a radio hobbyist into a six-year, $600,000 lawsuit, trying to bring it down. Combine crabby neighbors with apartment rules and the welter of federal, state, and local laws that can come to play on the antenna issue, and you'll know why there's always a strong demand for active antennas.

For those who are not familiar with active antennas, a good basic definitition is that an active antenna electrically simulates a longer antenna. If you are in a situation where a longwire would not be allowed or practical, you may want to consider the H800 Skymatch: it's a mere two feet long, yet performs like a 100-foot longwire. You can mount the H800 Skymatch inconspicuously on a porch, outside a window, on a roof, or in a tree.

A compact unit, it fits neatly in luggage or your brief case, making it great for travelers to liven up an otherwise boring motel room. Spectrum coverage by the H800 is interesting, too: 10 kHz through 50 MHz. That's VLF, medium wave, shortwave, and even a chunk of scanning's low band.

The H800 can plug into a wall outlet or can be operated with a 9 volt battery. Included is the antenna, 50 feet of coax, the control box, and an AC adaptor. Because the unit terminates in a RCA jack, you'll need an adaptor kit (about $7.00), if you don't have the adaptors in your junk box. The H800 Skymatch is $99.95 plus $8.00 UPS from Grove Enterprises, Box 98, Brasstown, NC 28902, or you can order toll-free, 800-438-8155.

Shortwave Asia

If you live in Asia or the Pacific Rim, there's a new publication that you might want to check out. The first edition of the *Australasian Shortwave Guide* is now available and it contains times, frequencies, target areas, relay sites, languages, and broadcast days of the external service transmissions targeted to Australia, Asia, the Far East, and the Pacific.

With nearly 600 entries, the data is arranged in two parts: by order of country of originating studio, and by time. Other features include a shortwave receiver guide, internet addresses of shortwave stations, and an article on DXing Madagascar. *MT* frequency manager Gayle Van Horn calls the book "helpful, comprehensive, and timely."

The *Guide* is sponsored by the Electronic DX Press Australia and is a non-commercial,non-profit venture. Whether the *Guide* will be published again in July is "dependant on support for this issue."

The book is A$10.00 (within Australia), or A$12.00/US$10.00 (or equivalent outside of Australia). Personal checks made out to Robert J. Padula, author, are accepted, as are money orders and Australian cash. To get your copy, write to 404 Mont Albert Road, Surrey Hills, Victoria 3127, Australia. Tell Robert you saw it in *Monitoring Times*.

Mini AM/FM

This is a really neat radio. It's tiny—just 3 inches by 1.5 inches by half an inch. It's inexpensive—just $29.95. And it works.

Down in Brasstown, the crew has been fascinated by the little SR-77 receiver and the way it pulls in signals. It also delivers high-quality FM stereo to its tiny earphones (included) or to the jack where you can plug in headphones. There's even a "deep bass" switch that can put surprising punch into the audio output. And while it's perfect for general use, this radio also leaps to mind as a perfect unit to keep on hand for emergency status.

Over the past decade or so, I've run across a dozen "emergency" type radios. Some come with solar panels or hand-crank generators of varying quality. Others have every imaginable and seemingly silly doo-dahs from sirens to flashing strobe lights. (I'm waiting for a radio with a water-purification unit built in.)

The bottom line is that in the case of your standard, run-of-the-mill disaster like a hurricane or earthquake, you get disaster info from the local broadcast stations. Your radio should be handy (i.e., "small") and reliable, made by a company that you can trust. And while that sounds much like a well-worn advertising slogan, it's really important.

You know that Sangean shortwave portables are solid. This one is Sangean's SR-77. You can get your SR-77 from Grove Enterprises. It's just $29.95 (!) Order by calling 800-438-8155. Or write to Grove at Box 98, Brasstown, NC 28902.

Hot Ham Calls

One of the hot things in the world of ham radio these days is "vanity" call signs—not unlike the vanity license plates for cars. There is far less room for creativity because of how ham calls are composed—1-by-2, 2-by-1 formats, and so forth—but hams are scrambling to get the call signs of deceased family members, calls that contain their initials, etc. One ham, James H. Roach of San Juan Capistrano, California, has reportedly bought 30, including his initials in three call areas: W2JR, W5JR and W6JR!

A new service is being offered by Fred Maia, publisher of the excellent *W5YI Report*. For $15.95 plus shipping, Fred will put together a list of available preferential calls signs on IBM-compatible computer disk. Each disk is custom made to your specified call sign area and license class from a database updated daily. It takes into consideration every possible call sign factor, including call signs which can't be assigned for one reason or another. Included with every diskette is a 30+ page report that tells you everything you need to know about getting the call sign of your choice.

To order, call W5YI at 1-800-669-9594 or write them at P.O. Box 565101, Dallas, TX 75356. Fred says that, as of the end of last year, over 6,000 vanity call signs have been issued and requests continue to pour into the FCC at the rate of 400 a week.

One other thing worth noting: in at least some cases, if your call sign is not granted, the FCC does not automatically refund your $30.00 application fee: you must specifically request a refund.

Put Sam Morse in Your Pocket

Here's a neat idea from MFJ. It's a pocket-sized Morse code tutor. About the size of a pack of cigarettes, it weighs just 5 ounces and can be taken anywhere.

Using earphones or the built-

in speaker, you start by learning individual letters, numbers, and prosign sets. As you do, previously learned sets are combined with new sets to reinforce all that you've learned. If you have trouble with certain characters, you can custom build and save a set of problem characters for extra practice. You can adjust the speed anywhere from 3 to a mind-bending 55 words per minute.

Once you get going, you can also copy realistic, on-the-air-style plain English QSOs. This will help you get ready for your FCC exam. There's also a "Word Recognition Mode" that gives you hundreds of commonly used words in amateur radio. The MFJ Morse Code Tutor is only $79.95 and comes with a "No Matter What" guarantee. To order yours, call MFJ at 800-647-1800 or write to them at P.O. Box 494, Mississippi State, MS 39762. Mention *MT* when you call.

So Cal Freq Book

One of the best local frequency guides is published by the same people who put out the best-selling national directories, *Police Call Plus*. Often called the "detail edition," the *Police Call Radio Guide for Southern California* is a special volume put out in cooperation with many of the pro monitors in the area.

The book is now in its 34th edition, which makes it probably the oldest continuously published frequency directory in the world. This year's edition is the biggest ever. It covers police, fire, rescue, federal, forrestry, aircraft, radio and TV news, sheriff, theme parks, highway patrol, mall security and more. Plus it's jam-packed with "detail" information like maps, unit numbering systems, and 10-codes.

You can find the *Police Call Radio Guide* (not to be confused with the *Police Call Plus* that's carried in your local Radio Shack) in local electronic and book stores. Or you can order a copy from Public Safety Radio Data, 362 Union Street, Doylestown, PA 18901. The cost is $12.95 plus $3.00 shippping.

Future Cops

Police robots replace officers for routine patrols. Police cars are sponsored by local businesses. A handheld device used by police is able to penetrate walls to detect individuals. Sound like a Hollywood sci-fi flick? According to Jane's Information Group, it's not. It's happening now.

Observing that salaries and pension take up some 80 percent of most police department budgets, some municipalities are investigating the use of "robotic security guards" to replace officers on static guard duty. The robots, which run on either wheel or tracks, can be programmed to patrol a fixed route or run free. Intruders can be interrogated by a two-way communications system.

As for the commercially-sponsored patrol car, don't laugh. It's already being tested in London.

In the newly released book, *Jane's Police and Security Equipment 1996-1997*, author Charles Heyman examines a number of new and proposed pieces of equipment and technologies intended to improve police efforts, as well as taking a look at a vast array of police and security equipment currently on the market. Some 1,300 items are covered in all.

Jane's Police and Security

Equipment 1996-97 (ninth edition) is available in print for $290.00 and on CD ROM for $795. To get your copy, call Jane's Information Group at 800-243-3852. Their address is 835 Penobscot Building, 645 Griswold Street, Detroit, MI 48226.

Fast Food Frequency List

It's been five years in the making. National Scanning is releasing a tasty, all-new Version 1.0 of their famous *Fast Food Frequency List*. Based on extensive research, it's a compendium of frequencies for Boston Market, Burger King, Dunkin Donuts, Kentucky Fried Chicken, McDonalds, Taco Bell, Wendy's and others. Like the original *Fast Food Frequency List*, this one is updated weekly as readers add new information and frequencies. To get your copy, send $3.00 to National Scanning, P.O. Box 360, Wagontown, PA 19376.

CB Freebie

Attention CBers: Firestik's new 1997 product guide is now out and it's free for the asking. The 28-page, full color booklet highlights a variety of CB, scanner, and ham antennas, kits, and accessories for use on autos, trucks, TVs, motorcycles, ATVs, passenger trucks, boats, and big rigs. The 1997 guide also provides valuable tuning instructions and lists the 10 most common problems that create poor SWR. You can get your copy by calling 602-273-7151 or by writing them at 2614 E. Adams St., Phoenix, AZ 85034-1495, or visit **www.firestik.com**. Mention *MT* when you get in touch.

Audio Transformers

SESCOM, Inc., has released a new MI-Series Audio Transformer catalog. The catalog describes 59 different transformers for high-quality audio applications. There is technical, electrical and mechanical information on all products. A free copy of the catalog can be obtained by phone, fax, mail, or e-mail, all free of charge. Call 800-634-3457, write 2100 Ward Drive, Henderson, NV 89015, or e-mail *sescom@anv.net*. Tell them *MT* sent you.

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Hwy 64 West, Brasstown, NC 28902

Press releases may be faxed to 704-837-2216 or e-mailed to mteditor@grove.net.

Lawrence Magne
Editor-in-Chief, Passport to World Band Radio

Breaking the Digital/Price Barrier

Since the late 1970s the most basic choice shortwave listeners have faced is between an analog portable that's cheap, or a digital portable that's costlier.

Obviously, it's much easier to tune a digital portable, for two good reasons. First, you can see the exact frequency on the digital display. Second, you can put favorite stations in presets, like on a car radio. On an analog portable, all you have is a tuning knob, plus a coarse dial-and-needle—like slide rules you or your parents used years back.

Frequencies change often

Of course, if you listen to the same frequency all the time, you really don't need a digital model. After all, once you've set a radio to the station you want, that's pretty much it. But on shortwave, most international broadcasters change frequencies throughout the day, seasonally, and at other times. Even something like 15070 kHz, which the BBC World Service used for half a century, was permanently withdrawn recently.

There are lots of reasons shortwave broadcasters change frequencies. Sometimes the reason is technical, where stations work together and haggle over who uses which frequency, when, and to where. The upshot is a fair amount of "shuffling of the deck" two or more times a year.

At other times, larger foreign policy considerations intrude. For example, during the Cold War when the sunspot cycle was near its maximum, International Broadcast Services (IBS) was doing the frequency management for a major broadcaster which was being intensely jammed by Soviet authorities. As an experiment, we had them put a retired radiotelephone transmitter on a frequency which I thought might be above the operating range of Soviet jammers. It turned out my hunch was right, and our client's signal started being heard without a trace of jamming.

This went on for about a year, when at an international conference the Soviets had lunch with a delegation from a neutral European country. Right after lunch, this influential European delegation suddenly decided to lodge a complaint, saying our client's transmission was causing "interference" to radio communications by Nordic farmers on their tractors.

If you can find a radio that looks like this now-defunct DAK product, it may well be the '3000 under yet another name.

Notwithstanding that this was the only one of our client's many frequencies getting through unjammed, I was told to change it—even though this meant a huge number of listeners would no longer be able to hear the station reliably.

Because of all these reasons and more, frequencies change often. So listeners need to be prepared to chase around the bands if they want to hear their favorite stations. For this, you can't beat a digital radio.

Electro Brand SW-3000 a viable alternative

Fortunately, things are moving in the right direction, and the inexpensive digital radio we've been testing is a good example of that. It's sold under various names, such as the Electro Brand SW-3000 and Tesonic R-3000—and it's made by the Disheng Electronic Cooperative in Guangzhou, China. But the main thing is that it sells worldwide for the equivalent of between $40-75.

Actually, this radio was originally sold as the DMR-3000 by the now-defunct mail-order firm of DAK. But it suffered from significant quality control and other problems that kept it from doing all it could do. Now, thanks to what appears to be much-improved quality assurance, it's a better radio.

Many features for price

The '3000 covers the AM broadcast, FM broadcast in stereo through earphones, and most shortwave bands. But unlike many other cheap digital portables, it can operate on AM at the 10 kHz channel spacing used throughout the Americas, as well as the 9 kHz spacing used elsewhere.

There's keypad tuning, another feature rarely found on inexpensive digital portables, and up/down frequency slewing—plus 36 station presets, of which 18 are for shortwave. As if that weren't enough, there's also a rudimentary scanner, an alarm, a snooze control, an illuminated display, and no less than two clocks!

Performance now reasonable

The '3000 had all these features back when DAK was offering it, but the difference is that it now performs better. Selectivity isn't brilliant, but it is a step above what you'll usually find in this price class. Because it's single-conversion, image rejection is mediocre, albeit no worse than any other model in this price range.

But sensitivity to weak signals is what's improved most—it used to be that because of casual assembly some shortwave bands came through much better than others. While we haven't gone out and bought a boatload of these radios to ensure that quality control is all it should be, it appears to be better.

Front-end selectivity continues to be poor, but if you don't live very close to a powerful radio station this shouldn't be a problem. DAK used to sell a $30 preselector to help overcome this, but if you have to spend $30 and add an outboard box and extra controls to make a $50 portable work right, you may as well spring for something that works right in the first place.

Another continuing problem is that the '3000 doesn't cover the important 22 meter (13 MHz) band, and it misses everything in the 31 meter band below 9500 kHz. There are some other small frequency chunks that it misses, too. So while its shortwave frequency

coverage isn't bad, it does omit some channels that better models include.

Attractive value, but hard to find

Withal, the bottom line is that the '3000 is a passable performer with lots of features at an exceptionally low price. Heartland America, a large mail-order firm in Minnesota, offered a variant of this model recently for $50. Unfortunately, they're now sold out and, according to a spokesman, "It doesn't look as if we'll be carrying this again anytime soon." Still, it wouldn't hurt to check firsthand with them at 800/966-1233 or **http://www.heartlandamerica.com**; ask about Item No. KC-7589.

The version sold as the Tesonic R-3000 is available in some shops in Beijing, but ironically it costs more there than outside China. Colleagues in Beijing tell me this is because radios made in China's economic zones are subject to a tariff, as if they came from a foreign country.

But this model is almost certainly out there in stores, somewhere, possibly under who-knows-what-names besides Electro Brand and Tesonic. Probably the wisest thing to look for is a digital radio that fits the picture and also has "3000" as part of its model designation. At $50 or so, it's definitely no superset, or even close. But it *is* an awfully good buy, and points to the day when digital radios will virtually replace their analog cousins.

If you do manage to find one, remember that even with its improved build quality it is a good idea to try to buy something like this on a money-back basis. To begin with, even well-known radios can have sample-to-sample variations in performance. But in addition, when you get your new plastic toy home and use it for a few days, you may find that it doesn't meet your expectations. If you can't buy it on a money-back basis, at least try to ensure you can exchange it immediately if it's acting up.

Sony ICF-SW7600G quality improves

Speaking of quality control, at *Passport to World Band Radio* we've ceased getting complaints about misalignment and other manufacturing shortcomings with the Sony ICF-SW7600G. The last sample we tested straight out of the box was spot on, as well. This is good news, indeed, because the '7600G, complete with synchronous selectable sideband, is one of the truly great values in a shortwave portable.

In fact, the '7600G actually appears to be commendably robust, holding up better over time than to most portables. So although it took Sony awhile to iron out the kinks in the production process, the ICF-SW7600G, at a street price of $200, now deserves a big "thumbs up" among portables on the sunny side of $350.

Grundig Satellit 900 due out late 1997

What's happened to the Grundig Satellit series? Whether because of listeners' cynicism being in high gear or poor communication from Grundig, the word has been out for several weeks that the first-rate Satellit 700 is no longer in production, and that its planned replacement, the Satellit 900, has been scrubbed.

Not quite, say our normally reliable sources at Grundig. Yes, the 700 has been dropped, although as of January some dealers still had a few new units waiting to be given good homes. But the 900 is alive and well, scheduled to come into production, probably from China, by year's end.

Yes, we've heard all this before, only to be treated to vaporware. But according to our sources, the primary chip used in the '900 was unexpectedly discontinued by its manufacturer, leaving Grundig with a radio that couldn't be produced. So they've gone back to the drawing boardand come up with a revised design using a new—and, they say, better—chip. Grundig claims they're using the opportunity to improve upon the original circuit design, so maybe this saga will yet turn out to have a happy ending.

This equipment review is performed independently by Lawrence Magne and his colleagues in accordance with the policies and procedures of International Broadcasting Services, Ltd. It is completely independent of the policies and procedures of Grove Enterprises, Inc., its advertisers and affiliated organizations.

RADIO DATABASE INTERNATIONAL WHITE PAPER® reports contain virtually everything found during exhaustive tests of premium shortwave receivers and outdoor antennas. For a complete list, please send a self-addressed stamped envelope to RDI White Papers, Box 300M, Penn's Park PA 18943 USA.

Bob Parnass, AJ9S

ICOM R10 Portable Communications Receiver

The ICOM IC-R10 is a shirt pocket size multimode receiver covering 0.5 to 1300 MHz. Cellular phone band coverage has been deleted from the United States version. Narrowband frequency modulation (NFM), wideband frequency modulation (WFM), upper sideband (USB), lower sideband (LSB), amplitude modulation (AM), and continuous wave (CW) detectors are included. IF bandwidths are fixed and a 30 kHz bandwidth for satellite or FM military monitoring is not provided.

The IC-R10 is powered by four AA penlight cells and is furnished with a "wall wart" power supply for operation from 117 VAC. A subminiature slide switch in the battery compartment prevents accidentally recharging alkaline batteries. While the AC adaptor provided is incapable of operating the radio and charging nicads at the same time, an adaptor of higher current capacity should do this satisfactorily. A battery saver circuit, with selectable duty cycle, is built into the radio. We used four alkaline cells to power our review radio, serial number 01048.

Memory Organization

The IC-R10 contains a single VFO and 1000 memory channels. There are 900 memory channels divided into 18 banks of 50 channels each. Another bank of 100 channels can be used to hold unique frequencies found during an auto store operation, which ICOM terms "auto-memory write scan." Up to 100 frequencies may be locked out during a search and stored in a final bank of 100 channels.

Each channel can be programmed with the detector mode (e.g., AM, USB), a tuning step size, an attenuator enable flag, and an eight-character label. It's a pity the memory label is only visible in manual mode, and only for a few seconds, after which a seven segment S-meter appears in its place.

Scanning and Searching

Individual channels can be locked out, or "skipped" from scanning. The IC-R10 permits scanning memories in one bank or all banks. You cannot select various combinations of banks, as you can in most other scanners. This limitation applies to the ICOM R7100A and R8500, as well.

Mode select scan, as found in other ICOM models, plods through all memory channels programmed with the same mode. Frankly, we have never found a good use for this type of scanning. More importantly, we measured a memory scan speed of six channels per second, very slow compared with other scanners (see bar chart).

The IC-R10 supports several types of searches including VFO and limit searches. Users can program 20 pairs of search limits, along with associated mode, step size, and search bank label. The auto-memory write and skip searches were discussed earlier. To choose a search type, you must press the V/F key to get into VFO mode, then press the side mounted FUNC key and another key at the same time. Searching doesn't commence until you press the SCAN key.

You can stop the search by pressing the SCAN key, but restarting the search is an ordeal. The IC-R10 doesn't remember what type of search you last chose, so it always starts over again in the VFO search mode.

You can select a global rescan delay which resumes scanning two seconds after the carrier drops, or a five or 10 second global preemptive pause. As in the R8500, the IC-R10's rescan delay cannot be defeated, making it more difficult to follow conversations on trunked or two frequency simplex systems.

At about 16 steps per second, our IC-R10 searches faster than it scans, but still slow by current standards. A "Signal Navigator" function is designed to speed up searching by looking for stations up to 100 kHz away while stopped on a busy frequency, but we didn't find it helpful.

Shortwave

The control used for squelch in FM and AM modes becomes an RF gain control when receiving SSB or CW. Our bench tests show the IC-R10 to be sensitive, but we couldn't receive many signals below 30 MHz using the supplied rubberized antenna. The HF signals we could hear were very weak. Replacing the factory antenna with a 19 inch whip improved HF reception moderately.

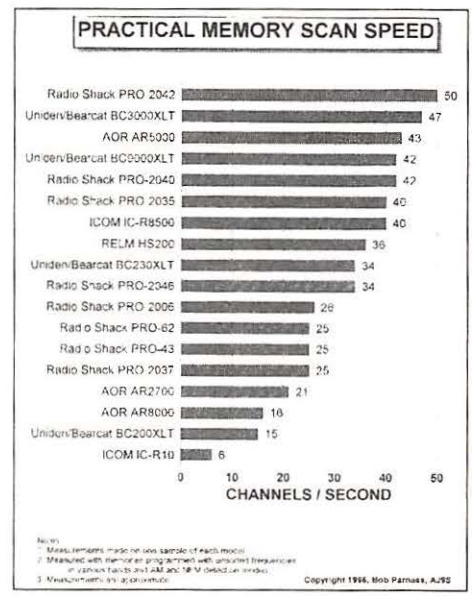
AM selectivity is fixed at 15 kHz, which permits good fidelity but is wide for listening under crowded band conditions. The 0.1 and 0.5 kHz step sizes make SSB and CW tuning easier, but the tuning knob moves in discrete steps and one wonders how long it will last if used often as a VFO control.

Taking the IC-R10 mobile? You can enable either the built-in noise blanker (SSB, CW) or automatic noise limiter (AM) to combat ignition noise.

Observations

The VSC (Voice Scanning Control) feature is designed to ignore unmodulated or constant tone signals while scanning or searching. It seems to work differently from the excellent VSC in the R8500. The IC-R10's VSC mutes the audio unless it thinks the radio is receiving a voice. It works even while in manual mode, albeit clipping human speech at times.

A key is used as a "soft" power switch instead of a mechanical switch integrated with the volume control. You must remove the radio from your belt or pocket to turn it on or off unless you can find the power key by



IC-R10 (left) shown next to RELM HS200 and Uniden BC3000XLT for comparison. (photo by Pam Parnass N9HRZ)

touch. The LCD display is impressive. It has adjustable contrast and can be backlit by green LEDs when any keys are pressed. A sleep timer can be armed to shut off the IC-R10 after a preset time.

With optional accessories, one R10 can clone another; it can also be used for "Reaction Tuning" (automatic loading into memory of active frequencies) when connected to the popular Optoelectronics Scout, and it can be connected to a host computer both for PC control and database downloading to its memory.

The 78 page instruction manual contains a few typographical errors and confusing passages. For example, the section which explains how to program a custom tuning step size is labeled "Set sleep timer" (p. 66).

This column evaluates equipment from the perspective of a VHF/UHF scanner user. How well does it perform the types of tasks for which hobbyists, especially *MT* readers, use a scanning receiver? The small size, wide frequency coverage, and VHF/UHF sensitivity of the IC-R10 are attractive. The four AA batteries are easily replaced. Its audio is adequate, though not room filling.

While the IC-R10 is packed with advanced features, it scans at tortoise speed and lacks the important rescan delay and bank flexibility found in VHF/UHF scanners costing far less. Time will tell whether the R10's smaller size, newness, and features will successfully challenge AOR's AR8000 as the hand-held leader.

AR5000 Clarification

We stated in the December 1996 column that the AOR AR5000 isn't as fast as our Uniden/Bearcat BC9000XLT. Although the BC9000XLT performs limit searches faster than the sample AR5000, the AR5000 measured a practical memory scan rate of 43 channels per second vs. 42 channels per second for the BC9000XLT. Enabling CTCSS squelch on the BC9000XLT slows its memory scan rate.

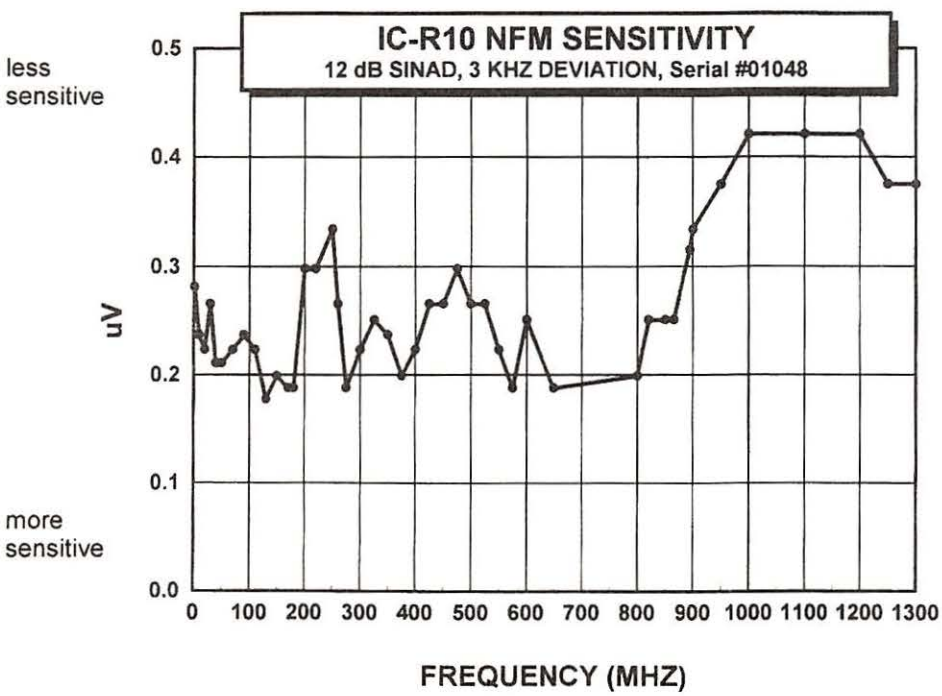


TABLE 1: Measurements, IC-R10 Serial Number 01048

Frequency coverage (MHz):
- 0.500 - 823.999
- 849.0001 - 868.9999
- 894.0001 - 1300

Tuning steps (kHz):
- 0.1, 0.5, 1, 6, 6.25, 8, 9, 10, 12.5, 15, 20, 25, 30, 50, 100, or programmable 0.1 - 999.99 in 0.1 increments

Intermediate Frequencies (MHz):
- 266.7, 429.1, 10.7, 0.455

Image rejection:
- 70.5 dB @ 155 MHz due to 1st IF (1013.2 MHz image), 50 dB @ 155 MHz due to 2nd IF (176.4 MHz image)

MDS (Minimum Discernible Signal), USB mode:
- -132 dBm (.05 uV) measured at approx. 2, 10, 20, and 30 MHz

Sensitivity, USB, 10 dB S+N/N:
- 0.24 uV at 2 MHz
- 0.18 uV at 10 MHz
- 0.13 uV at 20 MHz
- 0.22 uV at 30 MHz

Sensitivity, AM, 10 dB S+N/N, 1 kHz tone modulated 30 percent:
- 0.79 uV at 2 MHz
- 0.63 uV at 10 MHz
- 0.59 uV at 20 MHz
- 0.79 uV at 30 MHz

Sensitivity, NFM, 12 dB SINAD:
- better than 0.35 uV, 30 - 900 MHz
- better than 0.45 uV, 900 - 1300 MHz
- (see graph).

NFM Modulation Acceptance:
- 11 kHz

Audio output (measured at earphone jack):
- 76 mW at 10 percent distortion into 8 ohms

Search rate (approximate):
- 15.8 steps per second

Scan rate (approximate):
- 6 channels per second

Current consumption at 6 VDC:
- 0.14 mA off
- 131 mA squelched manual
- 158 mA squelched scanning
- 182 mA full volume, unsquelched

Clem Small, KR6A, CET

An Easy-Up Beam for Receiving or Transmitting

Why do many radio monitors and operators just love beam antennas? The bottom line is that a beam can often make an unreadable signal readable. A beam receives optimally from a particular direction, and this fact can be utilized to make the desired signal stronger. Just as importantly, the beam responds much less to noise and interference from directions other than that of the desired station.

In comparing the performance of a beam antenna to a non-directional antenna, these two factors—increased strength of the desired signal and reduced interference level—work together to give a better signal-to-noise ratio for the desired signal. This, of course, improves reception. Often dramatically so.

Various Beam Antennas

One category of beams is known as "wire beams." These include the long-wire beam, Vee, and rhombic beam. Although these beams are good performers, their disadvantages are that they are difficult to install, cost a good bit because of the large poles and long wires needed, and their optimum direction of reception cannot be changed once they are installed.

Some beams are known as "phased arrays." These are useful beam antennas; however, they tend to be time-consuming to construct, require a number of poles or towers, and cannot be reoriented once they are installed.

Beam designs such as the Yagi-Uda, quad or delta, and log-periodic array (LPA) are relatively small and less expensive compared to the beams discussed thus far. They can be made to rotate in any desired direction and are very useful, but still somewhat expensive, and above what many of us can afford.

An even simpler, easier to make, and less expensive beam than those discussed so far is the dipole sloper. This is a vertical, halfwave dipole near the ground, with its top end sloping away from the direction of the desired target. This gives both directionality and gain. By using more than one sloper held up by a single pole, you can have a useful beam (figure 1).

The sloper has modest gain, and can often do a good job of eliminating noise, including interfering stations, when that noise is not in the general direction of the desired station. And for the hams or CBers among us, this antenna gives good directional patterns for transmitting as well as for receiving.

Let's Make One

For my beam I used three slopers with their top ends tied to the same pole. You can use more or fewer slopers. Due to the sloper's broad reception pattern, four slopers is about the maximum you should try with this simple design.

Make the pole about as tall as one full dipole length, using the equations below. If you can't manage this length the beam will probably still work reasonably well with somewhat shorter poles. Don't make it too much higher than one dipole length, however, because it needs ground reflection to produce its beam effect.

1. You need two wires for each dipole as shown in figure 1. Their combined length can

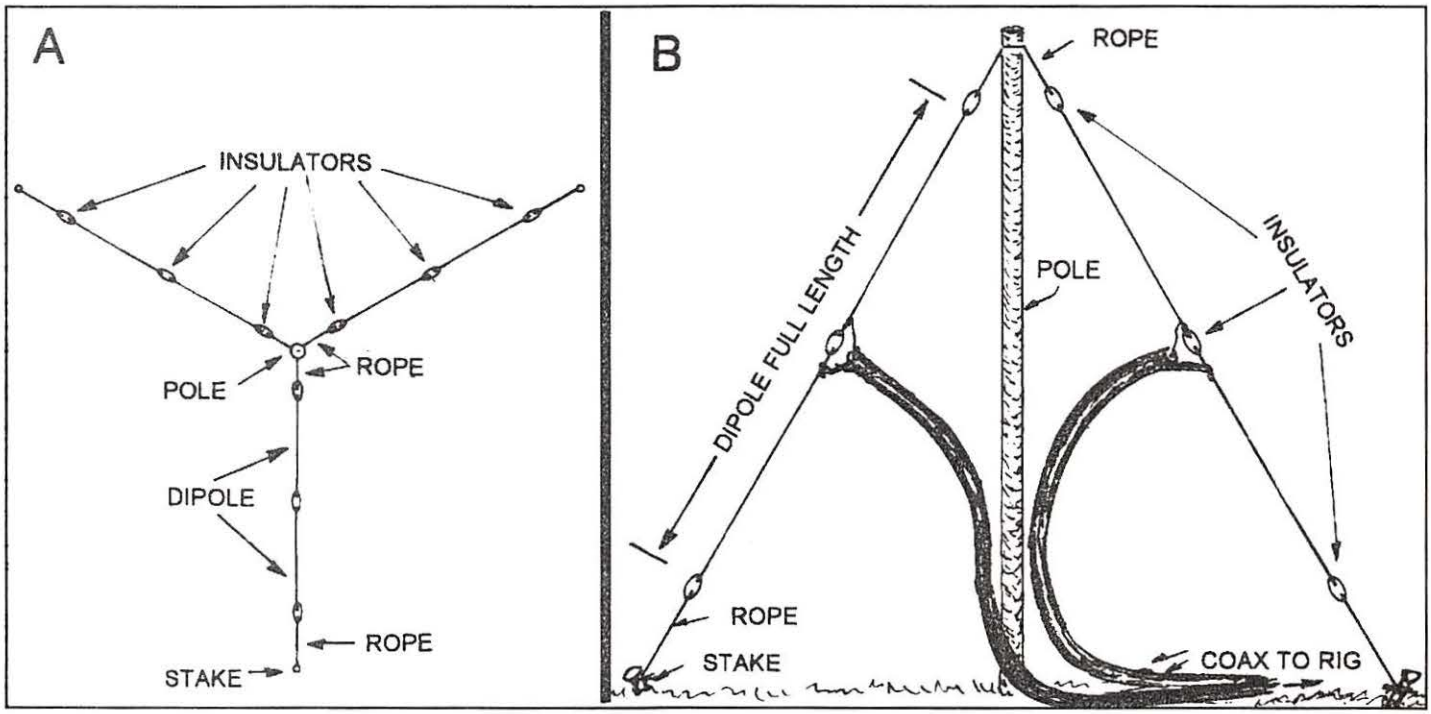


FIGURE 1: *A multiple sloper, switchable beam antenna. Top view using three slopers (A), and side view (B). For clarity only two slopers are shown in the side view.*

be found by either equation 1 or 2 below. Cut each section 6 to 8 inches longer than half the equation's calculated length, to allow for attaching to the insulators.

(1): Length (feet) = 468/frequency(MHz)

(2): Length (meters) = 143/frequency(MHz)

2. Assemble the two wires for each dipole as shown in figure 1 and attach their feedline. It's best to solder the connections if possible. Cover the connections and the ends of the coax with a coax sealant to keep out the weather.
3. Attach the dipoles so that the ends which are connected to the coax center conductor are tied by rope tethers to the top of the pole as shown in figure 1. Make these tethers about 1.5 feet long.
4. If possible tie the lower tether ends to stakes such that each tether makes something like a 60 degree angle with the ground (figure 1).
5. Run the feedlines from the dipoles to the pole, then to the ground, then along the ground to the radio (figure 1).
6. Minimum lightning-induced damage protection is disconnecting and grounding the feedlines when not in use. Don't use any antenna in weather likely to produce lightning.

Using the Beam

To use the beam connect only one feedline to your receiver. The others are connected to nothing. Tune in a station and change from one feedline to another to observe the beam's directional effects. Not every station will show an effect.

You can switch feedlines by simply unplugging one feedline and plugging in another, or by using a coaxial switch to change between feedlines. For HF antennas, if you don't have a coax switch, you can probably get good results if you use any switches you have on hand.

I have to admit that this simple beam's performance surprised me. I often found that I could either eliminate, or greatly reduce the strength of many interfering signals by switching from one sloper to another. Switching slopers often had a dramatic effect on the strength of the desired signal as well. The directional selectivity obtained with this beam is well worth the modest effort required to make it.

Boom, Boom, Boom

Bill Fawns, KE6HEZ, sends along the suggestion that if you need a fiberglass mast or boom for a VHF or UHF antenna, consider using one of the poles hardware stores carry to extend those short, curved, tree saws. The poles come in 6, 10, and 14 foot lengths, and should do a great job. Take a look at the price tag, though; they can be a bit pricey. Sometimes the longer ones cost in the $40 range.

RADIO RIDDLES

Last Month:

I asked "Why do you care if your antenna is resonant? Maybe you don't. If you don't, should you? What is resonance anyhow?"

For transmitting antennas resonance is usually important for such things as developing a desired radiation pattern or having an acceptable impedance at the desired feedpoint location. However, for receive-only antennas—those of most interest to *Monitoring Times* readers—it is a different story.

Resonance, in simple terms, is the condition of an electrical circuit such that it responds maximally to a specific frequency. This frequency is its resonant frequency, or the frequency to which it is said to be tuned. An antenna which is resonant to the signal which it is receiving generally develops more output from that signal than would a non-resonant antenna.

On VHF and higher frequencies, this increased strength means better reception, and so most antennas for those frequencies are resonant designs. But at HF and lower frequencies you or may not benefit from having the extra signal strength which resonance can provide. Therefore, a resonant antenna may not be of particular value on the noisy HF band or lower frequencies. In these bands a simple short wire may do as well as a more sophisticated antenna. So, yes, you should care if your antenna is resonant—sometimes.

Now let's continue this line of thought, and try to understand the "sometimes" aspect of our answer as we move to this month's riddle.

This Month:

Why is it usually useful to increase the strength of received VHF and higher frequency signals by making a receiving antenna resonant, but it's not often useful at HF or lower frequencies? Hint: these lower frequencies usually have more received noise than VHF or higher frequencies.

You'll find an answer for this month's riddle, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

SPECIAL EVENT CALENDAR

Mar 1	Comer, GA	NE Ga "Bubba" Net / (V.E) James Daniel AE4HS, 152 Windfall Dr, Winterville, GA 30683, 706-742-2777. Location: Madison Co Fairgrounds 1/2 mi. south of Athens on Hwy 22. Talk-in $5. Camping $6, Adm $5.
Mar 1	Tuscaloosa, AL	Black Warrior Swapfest / Kelly Bruce, WD4DAT,205-339-7882
Mar 1	Cave City, KY	Mammoth Cave ARC / Mark Woodcock, N4SFA, 502-651-8777
Mar 1	Absecon, NJ	Shore Points ARC / John G. Barbieri, KB2HZU, 609-653-1987
Mar 1	Parsippany, NJ	Split Rock ARA, W Morris Wireless / Bernie Brownstein, WB2YOK, 201-584-5399
Mar 1	Elk City, OK	W Central OK ARC / Earl Bottom, N5NEB, 405-473-2572
Mar 1	Cleveland, TN	Ocoee ARS / Alan Pinney, AE4FC, 423-478-1141
Mar 2	Livermore, CA	Livermore ARK / Noel Anklam, KC6QZK, 510-447-3857
Mar 2	Bristol, CT	Insurance City Rptr Club / Pete Brunelli, 860-620-0176
Mar 7-8	Lewiston, ME	Maine State Conv / Dave Blethen, KD1OW, 207-353-6433
Mar 7-9	Lafayette, LA	Acadiana ARA / L. Al Oubre, K5DPG, 318-367-3901
Mar 7-9	Norfolk, NE	Nebraska State Conv / Rick Kropf, KG0IX, 402-371-7684
Mar 8	Englewood, FL	Englewood ARS / J.R. House, K9HUY, 941-475-3005
Mar 8	Hazard, KY	Kentucky Mt ARC / John Farler, K4AVX, 606-436-5354
Mar 8	Puyallup, WA	Mike&Key ARC / Michael Dinkelman, WA7UVJ, 206-631-3756
Mar 8-9	Charlotte, NC	Roanoke Div Conv / Tim Slay, WO4G, 704-948-7373
Mar 9	Indianapolis, IN	Morgan Co Rptr Assn. / Brian Elliott, N9JPX, 317-342-7236
Mar 9	Lindenhurst, NY	Great So Bay ARC /Walter Wenzel, KA2RGI, 516-957-0218
Mar 9	Waukesha, WI	SE WI FM ARS /Jam Lazachek, KF9GG, 414-650-0724
Mar 14-15	Kulpsville, PA	10th Winter SWL Festival / P.O. Box 591, Colmar, PA 18915. Location: Holiday Inn, Sumneytown Pike. Full registration $35, $17 no meals.
Mar 15, 22, Apr 5, 12	Clayton, MO	Skywarn Weather Observation Training / Level 1 Training in a.m.; Level 2 in p.m. For locations call the Severe Weather Info Line, 314-889-2857 for taped message. Certification for RACES & SKYWARN. No advance registration; people outside the area also welcome. Michael Redman, KA0YXU, 314-889-2362.
Mar 15	Linda, CA	Yuba Sutter ARC/ Ron Murdock, W6KJ, 916-674-8533
Mar 15	Marietta, GA	Kennehoochee ARC /Margaret Durham, KB4QKW, 770-977-4405
Mar 15	Marshall, MI	So. MI ARS, Marshall HS Photo Electronics / Wes Chaney, N8BDM, 616-979-3433
Mar 15	Knoxville, TN	Kerbela AR Service / Paul Baird, K3PB, 423-986-9562
Mar 15-16	Ft Walton Bch, FL	Playground ARC / Clyde Gowdy, KE4FLC, 904-314-3337
Mar 15-16	Tulsa, OK	Oklahoma State Conv / Merlin Griffin, WB5OSM, 918-272-3081
Mar 15-16	Midland, TX	Midland ARC / Beverley Harwood, KC5BNT, 915-686-1841
Mar 16	Sterling, IL	Sterling-Rock Falls ARS / Lloyd Sherman, KB9APW, 815-336-2434
Mar 16	Maumee, OH	Toledo Mobile RA / Chuck Krukowski, KB8FXJ, 9408 Salisbury Rd., Monclova, OH 43542, 419-243-3836/ (Info & Voice Mail - 866-5928)
Mar 16	York, PA	Keystone VHF Club / John H. Shaffer, W3SST, 2596 Church Rd., York, PA 17404, 717-764-4805/Fax 17 -8193
Mar 16	Charleston, WV	Charleston Area / Jimmie Hewlett, WD8MKS, 304-768-1142
Mar 16	Jefferson, WI	Tri-County ARC / TCARC, 414-563-6502
Mar 22	Jonesboro, AR	Jonesboro ARC / Pat Snodgrass, KB5FYN, 501-972-9132
Mar 22	Sebring, FL	Highlands Co ARC / Roy Loweke, KE4JCT, 941-382-4607
Mar 22	Kansas City, MO	Ararat AR Shrine C / Roger E. Bessmer, KB0IIG, 816-842-0400/ fax: -0800
Mar 22	West Orange, NJ	Irvington-Roseland AC / Jim Howe, N2TDI, 201-402-6066
Mar 23	Grayslake, IL	Libertyville&Mundelein ARS / Frank Avellone, W9GLO, 847-234-4124
Mar 23	Trenton, NJ	Delaware Vall RA / Darryl Foyuth, N2JVP, DVRA, PO Box 7024, West Trenton, NJ 08628, 609-882-2240. Location: Tall Cedars of Lebanon picnic grove, Sawmill Rd. Talk-in 146.670 -. 8 am, adm $5, non-ham spouses, children, free.
Mar 23	Yonkers, NY	Westchester Emerg Com Assn. / Thomas Raffaelli, WB2NHC, 914-741-6606
Mar 23	Kinston, NC	Down East Hamfest / Doug Burt, W4OFO, 919-524-5724
Mar 23	Madison, OH	Lake County ARA / Roxanne, 5777 Fernwood Ct., Mentor/Lake, OH 44060, 216-256-0320. Location: Madison High School. 8am-2pm; adm $5.
Mar 23	Monroeville, PA	Two Rivers ARC / Bill Hetrick, N3LQC, 412-754-0562
Mar 28-29	Columbus, GA	Columbus ARC / Randy Hancock, KT4KP, 706-596-8820
Mar 29	Michigan City, IN	Michigan City ARC / Ron Stahoviak, N9TPC, 219-325-9089
Mar 29	Hudson, NH	Interstate Rptr Society / John Brunelle, KA1FYB,603-881-5796/ Fax -598-0181
Mar 29	Tullahoma, TN	Mid Tennessee ARS / Ian Haynes, AB4SW,615-649-5187/fax -2941
Mar 29	Weatherford, TX	ARC of Parker Co / Allen "Griff" Griffith, KB5UNY, 817-441-9114

Send anouncements of events or club information to: Editor, Monitoring Times, P.O. Box 98, Brasstown, NC 28902-0098. Fax 704-837-2216; e-mail mteditor@grove.net. See MT's homepage on **www.grove.net** for complete event and club listings.

CLUB CIRCUIT

North American Club Listings I - P

Int'l Radio Club of America (IRCA): Ralph Sanserino, P.O. Box 1831, Perris, CA 92572-1831. Worldwide; BCB/AM DX. *DX Monitor (34 x)* $25 US, $27 Can/Mex, $28.50 ww. First-class stamp or 2 IRCs for sample.

Longwave Club of America: Bill Oliver, 45 Wildflower Rd., Levittown, PA 19057, (215)945-0543. Worldwide; Longwave only. *The Lowdown.* $18 US, $19 Can/Mex, $26 ww.

Metro Radio System: Julian Olansky, P.O. Box 26, Newton Highlands, MA 02161, (617) 969-3000. New England states; Public Safety. *M.R.S. Newsletter.*

Michigan Area Radio Enthusiasts: P.O. Box 530933, Livonia, MI 48153-0933. E-mail xx024@detroit.freenet.org. Great Lakes Region. All bands. *Great Lakes Monitor.* $9.50 annual US & Canada. $1 sample.

Minnesota DX Club: Greg Renner, 16330 Germane Court, Rosemount, MN 55068, for meeting info. Minnesota. All bands. *MDXC Newsletter.* $10 annual.

Monitoring the Long Island Sounds: Ed, 2134 Decker Ave, North Merrick, NY 11566. Primarily scanner, some SWL. 50 mi. radius of LI. Net Tues 8pm 146.805. *Monitoring the Long Island Sounds.*

MONIX (Cincinnati/Dayton Area Monitoring Exchange): Mark Meece, 7917 Third St., West Chester, OH 45069-2212, (513)777-2909. SW Ohio, SE Ind., N Ken; All bands. Meets 2nd Sats 7pm. Net Thurs 9:30 145.210/4.610. No dues.

Mountain NewsNet: James Richardson, P.O. Box 4488, Estes Park, CO 80517-4488, (970) 586-4325vx; 4357fax; Internet jimfun@aol.com. Colorado statewide. Public Safety notification group. *Mile High Pages.*

National Radio Club: Paul Swearingen, Publisher, P.O. Box 5711, Topeka, KS 66605-0711, (913)266-5707; http://wcoil.com/~gnbc/ Worldwide; AM DXing. *DX News* 30 times yearly, sample for a first class stamp. Annual Labor Day convention.

New England Scanner Group: P.O. Box 1024, Derry, NH 03038. CT, ME, MA, NH, RI, VT. $29.95 annual.

North American SW Assoc: Bill Oliver, 45 Wildflower Lane, Levittown, PA 19057, naswa1@aol.com (215) 945-0543. Worldwide; Shortwave broadcast only. *The Journal.* Web site: http://www.mcs.com/~ralph/html/naswa/. Regional meetings. $26 annual in NA.

North Central Texas SWL Club: Alton Coffey, 1830 Wildwood Drive, Grand Prairie, TX 75050. North Central TX area; All bands.

Ontario DX Association: Joe Robinson, General Mgr., P.O. Box 161, Station A, Willowdale, Ontario M2N 5S8, Canada: Internet 70400.2660@compuserve.com; (416) 293-8919 voice & fax, (416) 444-3526 DX-Change information svce; (905) 841-6490 BBS. Predominantly Province of Ontario; All bands. *DX Ontario.* Meet 3rd Wednesdays, Toronto

Pacific NW/BC DX Club: Bruce Portzer, 6546 19th Ave NE, Seattle, WA 98115. Pacific NW and BC Canada. DXing all bands. $9 US, $10 Canada. *PNBCDXC Newsletter.* Irregular meetings.

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ACCESSORIES

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ACC 03	OPC-478 computer interface cable	$45.95
ACC 04	OPC-479 Cloning cable (r10 to R10)	$17.95
DCC 05	CP-12 cigarette lighter cable w/noise filter	$29.95
CAS 01	LC-140 Carrying case	$29.95
SFT 01	CS-R10 Cloning software (use with ACC 04)	$29.95
HDP 03	Lightweight Comm. Headphones	$22.95

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ASK BOB

ANSWERS TO YOUR RADIO QUESTIONS

Bob Grove, WA4PYQ
bob@grove.net

POSTSCRIPT P.S.

A reader sent this comment via e-mail: "You missed the best answer: The real way to print Postscript on a non-Postscript printer is to use the software Ghostscript or the software ROPS. I prefer ROPS which can be found on Info-Magic's "The Best of Windows 95.com Shareware Collection." One could also check ftp sites for these.

Q. Is there an optimum length of antenna for receiving shortwave signals? (Donald Michael Choleva, Euclid, OH)

A. Theoretically, it depends upon the frequency band of interest. For the traditional, center-fed dipole, which has a reception pattern which favors signals at right angles to the wire, and rejects signals off the ends, the wire should be a half-wavelength (in feet) at the center frequency. You would calculate this length by dividing the number 468 by that frequency in megahertz. For example, at 7 MHz, you would divide 7 into 468, making the wire 67 feet long, the common length of a wire dipole for the 40 meter ham and adjacent 41 meter shortwave broadcast band.

So what happens if you use another length? If the wire is twice as long as it should be, there are two directions of response off each side (a cloverleaf pattern), and four nulls (little or no response to signals), two off the ends, and two at right angles to the wire. At higher and higher frequencies with the same wire (which is the same as saying at longer and longer wire lengths for the same frequency), the patterns grow more and more multi-lobed.

In some cases this isn't bad. For example, you could cut the dipole for lower-frequency, ground-wave coverage frequencies where you know the signals will be arriving fairly consistently from a particular direction broadside to the wire, but you would also receive higher-frequency skip signals from various directions around the earth because of the multi-lobed pattern of the higher frequencies on that wire.

See this month's adjacent tip for bandplanning your shortwave antenna.

Q. What substance was used in the old crystal sets? Can super crystals be made for better pickup?How can you improve a crystal set? Can they tune any frequency range? Can they have noise limiters? (Robert Brock, Phoenix, AZ)

A. A crystal set is nothing more than an audio detector connected to a tuned circuit; as such, it can tune any frequency range, but its selectivity and sensitivity is very limited and it can only receive amplitude-modulated signals.

There were more than 100 different materials used for the detector crystal, including carborundum, copper sulfide, and iron sulfide (fool's gold), but galena (lead sulfide) was by far the most successful. With advent of transistors, mass-produced, wire-leaded diodes of germanium and silicon were substituted with better sensitivity and dependability. An inexpensive Radio Shack 1N34A germanium diode is better than any cat's whisker detector ever made.

Later-era crystal sets became more sophisticated by employing several tuned stages to sharpen selectivity and adding active (amplifier tubes) circuits to improve sensitivity.

Any noise limiter would have to be placed either before a simple crystal set (such as the JPS Noise Canceler) or after it (like the Grove

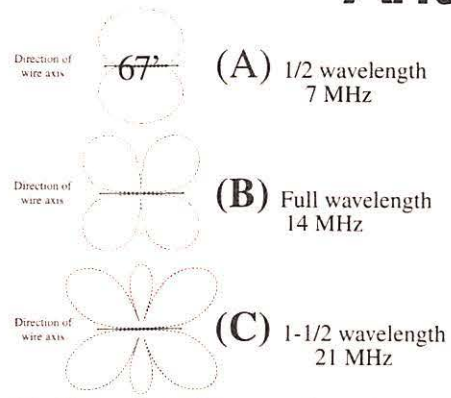
Bob's Tip of the Month

Bandplanning Your Shortwave Antenna

The 67 foot, 7 MHz, half-wave dipole is the most common shortwave antenna for both transmitting and receiving. It has good impedance-matching characteristics for transmitting on 40 and 15 meters even without a transmatch ("tuner"), and works very well for receiving the entire shortwave spectrum. But knowing a little about the pattern it generates can be useful for erecting it to favor certain directions.

To "bandplan" your dipole, secure a world globe and stretch a piece of string between your location and a target country you wish to hear at the lower frequencies (5-10 MHz). Suspend your antenna so that the signals arrive broadside to the wire. In other words, if you wanted to favor signals directly east or west, the antenna wire would be stretched north and south. At higher frequencies (11-30 MHz), you will receive signals from several different directions.

Referring to the accompanying diagrams, note that as the frequency increases for any given length of antenna, its radiation pattern (the same as its reception pattern) becomes more multi-lobed, but signals directly off the ends of the wire are still deeply attenuated.



A halfwave dipole (A) as seen from above has a classical figure-eight pattern at right angles to the wire. The same antenna at twice the frequency, now a full wavelength, has a cloverleaf pattern. As the frequency increases as shown at (C), more lobes are added.

SP-200 Sound Enhancer).

For information on publications pertaining to crystal sets, send an SASE to the Crystal Set Society, PO Box 3026, St. Louis, MO 63130.

***Q.** I was reading a military aeronautical frequency directory and saw that 30-88 MHz is used in wideband FM; can I hear anything by tuning just below 88 MHz on my FM broadcast tuner? (Robert Brock, Phoenix, AZ)*

A. Not in Region 2 (North America). In foreign countries, the 66-88 MHz part of the spectrum is sometimes occupied by low power PRC (portable radio communications) backpack units used by ground troops, and even rarely in the U.S. during practice maneuvers by the National Guard, but never in air-to-ground communications because the greater distances would cause interference to TV reception; channels 2-6 are found between 54 and 88 MHz.

30-54 MHz is commonly used by many military services in the U.S. and elsewhere, but the mode is not wideband FM (150 kHz deviation), but mediumband FM (30-40 kHz deviation), as opposed to common narrowband FM (15 kHz) as found in the domestic land mobile services.

***Q.** What is the difference between AM and SSB? (J. Hammond)*

A. Most CB, shortwave, and medium wave broadcast signals use amplitude modulation (AM). This means that the carrier wave (just the pure transmitted power with no voice modulation, the signal that holds the S meter up) is modulated, or varied, with the voice frequencies. In other words, when you hum or whistle at 1000 Hz (a pitch of 1000 vibrations per second) into the microphone of that AM transmitter, the carrier wave vibrates up in down in strength, or amplitude, 1000 times per second.

Modulation also causes the single-frequency carrier wave to widen in unison with the sound, occupying more spectrum space above and below the center of the carrier frequency. These added sidebands are identical to each other in their sound content, so if we could remove one sideband and the carrier wave, we could still detect the sound, but we would have substantially narrowed the signal width, allowing more stations to occupy the same amount of spectrum. We have created, then, a signal consisting of only one single sideband (SSB). We can choose either the upper sideband (USB) or the lower sideband (LSB) for our information.

There are other advantages SSB has over AM besides spectrum efficiency. For one thing, your receiver can use sharper selectivity since the signal bandwidth is narrower, thus rejecting adjacent channel interference and reducing the amount of background noises, making it easier to hear.

Additionally, the narrow SSB signal is not as vulnerable as wider AM to the distortion produced by frequency-selective fading resulting from ionospheric refraction, so the integrity of the sound is better as signals waver and flutter.

Questions or tips sent to "Ask Bob," c/o *MT* are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of *MT*, or e-mail to **bob@grove.net**. (Please include your name and address.) The current "Ask Bob" is now online at our WWW site: **www.grove.net**

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RC-740X, band expansion for KENWOOD 741/742 series, ScannerWEAR WINDOWS software for ICOM, AOR, Opto receivers. See all at http://www.radioscan.com. Radio Control Systems Inc. (800) 560-7234.

SPORADIC WAVES! A newsletter that will surprise you ... FREE SAMPLE! All you need to do is ask; Pineapple Paradise Radio Company, P.O. Box 751, Chester, MA 01011.

TEST EQUIPMENT BONANZA! Free shipping! Bird 4411W wattmeter, like new; elements for 2-30, 144-520, 400-1000 MHz, leather case. Orig. cost $1383 (order TIN75 $699.95). Tenney Jr. Environmental Test Chamber (order UTST-1 $2000.00). Hewlett Packard Draft-Pro Excel Plotter MDL#7576A (order UPTR2 $2000.00). Grove Enterprises, P.O. Box 98, Brasstown, NC 28902. 1-800-438-8155.

HAMFEST, Trenton, NJ, March 23, 1996. TCL picnic grove. Setup 6:30 AM, open 8:00 AM. Admission $5.00, tailgating $10.00, covered space and table $15.00. Talk-in 146.67 (-). Hamcomp '97, DVRA, PO Box 7024, West Trenton, NJ, 08628. (609) 882-2240. http://www.voicenet.com/~acelog

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SHACK CLEAN-OUT! SASE for list of books, magazines, etc... Brandon Artman, 515 Maryland Ave., West Chester, PA, 19380-2255.

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WANTED: one Sony FRQ-80 frequency converter (Part No A-3614-013A) for Sony ICF PRO-80 receiver. Frankie Gittens, 40 Clerview Heights, Stage 1, Clermont, St James 170909, Barbados, West Indies. (246) 438-4989.

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PANASONIC RFB-65, as new, $175. BC-800XLT, cellular, like new, $175. Realistic DX-392, as new, $180. WB9YCJ/6 (714) 564-9010.

McINTOSH MR-78, considered "Simply the Best" FM tuner ever made (MT July '93, p.49), excellent, $1095; Tandberg 3001 tuner, great second best, $525; Pioneer TX-9100, $165; Pioneer TX-9500 II, $185. (412) 243-1569.

Letters

(Continued from Page 4)

how quickly and conveniently they forget their own culture's history!) The previous theme, by the way, was the folksong known in Russian as 'Vo pole beryoza stoyala' (A birch tree stood in the field).

"VOR also commented on the recent (now overturned) decision of the Canadian government to stop RCI broadcasts this coming April. The general tenor was one of support for RCI and the role such broadcasts played in the past (i.e., RCI, BBC, and others brought them the news they didn't get elsewhere).

"On another topic: do you have a Web address for VOA? I haven't picked up any of their broadcasts recently, at least not in Russian, and I want to find out what's going on with them."

You thought finding VOA frequencies would be simpler than locating Voice of Russia, didn't you, Paul? So did Mr. and Mrs. Robert Senkmajer, who used the address provided in the *World Radio TV Handbook* to write to the Voice of America requesting a schedule. Instead, they received a letter from the U.S. Information Agency, explaining that their "Freedom of Information Act request" could not be granted because the U.S. Information and Educational Exchange Act "prohibits disemination within the United States of information about the U.S., its people, and its policies when prepared by the Agency for audiences abroad."

The Act serves as a safeguard against the government spreading propaganda to its own citizens. Of course, it also discourages us from "finding out what's going on with them." Thank goodness for the Web! Now you may go to **www.voa.gov** or to **gopher://gopher.VOA.GOV** for schedules in all languages.

Letters are edited for brevity and clarity by Rachel Baughn, Editor. Send your comments to "Letters," P.O. Box 98, Brasstown, NC 28902 or to *mteditor@grove.net*

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CLOSING COMMENTS

By Bob Grove, Publisher

Gingrich and the Cellular Telephone:
Much Ado About Newting

In the third week of January, the telephone lines at *Monitoring Times* were jammed with inquiries from the media about the celebrated cellular intercept of Newt Gingrich's telephone conversation. For the benefit of *Monitoring Times* readers, the following is a slightly condensed version of my response which was posted on the Grove web site as an aid to media and hobbyists alike.

How was it done?

A Gainesville, Florida, couple, John and Alice Martin, claimed to have snagged a conversation between several parties on a recent-model Radio Shack scanner. Newt Gringich was in Washington, but one of the conference-call participants, Rep. John Boehner, was in Florida, close enough for his cell phone to be heard by the Martins.

While the cellular industry may give their customers the illusion of privacy by assuring customers that it is illegal to listen, millions of Americans do listen in. They do it with the older, cellular-capable scanners that are still in service, and they even do it with modern scanners by "image reception," the tuning in of cellular conversations on non-cellular frequencies which are inadvertently generated by all scanners. Frequency converters are also no longer allowed to be manufactured or imported, but there are plenty of them around.

Some cellular-deleted scanners, like the AOR AR8000 and AR3000A, can have that tuning range easily restored by a computer routine; others can be internally modified. Government agencies, which include volunteer fire departments, may also purchase cellular-capable scanners

Test equipment is not required to have FCC approval to include cellular coverage; this is how the Optoelectronics Xplorer frequency counter/FM receiver is permitted to be manufactured and marketed nationwide. Similarly, higher-priced equipment like spectrum analyzers and service monitors also have full frequency coverage.

Can you reveal what you hear?

Is it lawful to listen in and tell? No. Section 605 of the 1934 Communications Act specifically forbids the disclosure of information overheard on the radio, or the use of that information for personal gain. And the Electronic Communications Privacy Act of 1986 (ECPA '86) proscribes against even listening to the radio portion of a telephone conversation. While the Martins may plead ignorance of the law, that's no excuse in the courts. There's also a credibility issue: Is it reasonable to believe that the Martins, aware of the import of the conversation, did not think that turning the tape over to the Congressional investigators would be harmful to Gingrich?

So who's to blame?

Why are cellular calls so vulnerable to eavesdropping? Aren't there scrambling devices available to secure privacy? Yes, but they are in use in only a tiny minority of cellular systems; the vast majority of cellular telephone calls are in the clear, capable of being overheard by millions of scanner listeners. The cellular industry does not provide the security which their subscribers expect.

Are scanner listeners just a bunch of nosy, unconscionable snoops? No. Like you, me, and most other Americans, we are interested in what goes on around us and instinctively drawn to dramatic situations. The vast majority of scanner enthusiasts are intellectually active, recreational listeners who enjoy scanners as an extension of, or replacement for, broadcast radio and television.

By tuning in on communications, we get the feeling of "being there," and would never use overheard information to cause harm. To the contrary, police reports commonly cite scanner monitors as good citizens, with their tips often leading to the recovery of missing persons and stolen property, interruption of crimes in progress, evidence leading to arrests, and other support for law enforcement.

Can listeners report criminal activities overheard on a radio telephone?

The negative stereotyping of scanner owners by some news media may have a chilling effect on contributions listeners make to law enforcement. Strictly speaking, we should not be listening in on telephone calls made over cellular, cordless, air-to-ground, ship-to-shore, or any other type of radio system. But what if a scanner buff illegally overhears the discussion of a crime? Can he report it to officials and expect immunity from prosecution?

The law says that you cannot listen to radio telephones; it also says that you are required to report to authorities any knowledge you have of a crime. If you are in possession of important information, it is recommended that you appear in front of the law enforcement officials with an attorney to guarantee your immunity from prosecution in return for your testimony. Can a civil suit be brought against you by the defendant? Perhaps, but there is general opinion among those who practice law that the user of any radio telephone waives any reasonable expectation to privacy.

The outcome of the Gingrich cellular telephone intercept may have far-reaching implications in radio law.

Catch MORE Listening Excitement!

PC Programmable for Total Scanning Control!

Using a PC and available third party FCC Master File licensee database info (on CD-ROM or HD Disks), quickly customize your IC-R10 to scan only the active channels you want – anywhere in the country! ICOM's CI-V computer interface is built right in! You can also quickly clone data from PC to IC-R10, or from one IC-R10 to another.

Advanced Operation in an Easy to Use Package!

- Beginning listeners can start out using the IC-R10's ***easy mode:*** select 1 of 10 band scan programs set by ICOM's factory. As your listening preferences grow, the scans can be changed to follow the listener's desired settings!

Actual Size!
2.3"(w) x 5.1"(h) x 1.2" (d)

Uses Ni-Cd, Alkaline or other DC Power**

The IC-R10 comes with a battery pack that uses either "AA" alkalines or the ***included "AA" Ni-Cd batteries****. For frequent listeners, use the right-in-the-radio rechargeable Ni-Cds (AC wall charger plug also included). Infrequent listeners may prefer using alkalines for their long power storage capacity. Or use an external DC power source, like a car cigarette lighter!*

Next Generation Features for the Serious Listener!

- ***7 different scan types*** with ***priority watch*** include the all ***new "signal navigation" (SIG NAVI) scan.*** While you listen to a paused frequency, the SIG NAVI scan looks for the next busy frequency (within ± 100 kHz)!
- ***Tunable bandpass filters*** provide excellent image reception and help reduce intermod.
- A ***built-in 20 db attenuator*** helps block unwanted noise.

- A ***"real-time" band scope*** makes it easy to find busy frequencies and to note band conditions. *A handheld first!*
- The ***alphanumeric dot matrix display*** allows up to 8 characters per channel name and up to 10 characters per bank name.
- Large ***36mm† speaker*** for loud, crisp audio.
- ***1000 memory channels*** with an EEPROM. Memories are arranged in ***18 banks of 50 channels***, with 100 channels for auto memory write and program skip scan.
- Noise blanker, lock, sleep timer, auto frequency control (AFC), & more!

Impressive Specifications!

- ***Wide band performance!***
  500 kHz – 1.3 GHz coverage*
- ***All Modes, including SSB for SWL's***
  AM, FM, WFM, USB, LSB, CW

The All New, Advanced Performance, Affordably Priced

IC-R10

Next Generation Receiver

Call 206-450-6088 for a free brochure!

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NEW Xplorer

It's a receiver

a counter, a recorder, a decoder....

U.S. Patent No. 5,471,402

•Two-Line LCD display, first line displays frequency. Second line switches between either CTCSS, DCS, DTMF, Signal Strength, or Numerical Deviation.

NMEA-0183 GPS Interface,-Connect your GPS to the Xplorer for Mapping applications. *(GPS and Mapping Software not included)*

The New Xplorer Test Receiver. Ideal for any two-way communications testing or monitoring. The Xplorer is a value packed performer integrating the functions of a CTCSS, DCS, and DTMF Decoder, Frequency Recorder, Nearfield Receiver and more into one hand-held unit. No more guessing when programming a frequency for monitoring-the Xplorer captures nearfield frequencies off the air from 30MHz - 2GHz in less than 1 second. The New Xplorer; providing the power of handheld portability with state of the art functionality and performance.

•Built-in Speaker. All frequencies received are demodulated for instant monitoring.

...and the last instrument you will ever NEED.

Features & Specifications

•Easy touch control pad. F1 & F2 keys control all Xplorer functions. Hold, Skip, Store and Lockout all enabled through the keypad.

- •Frequency Lock Out, Manual Skip, and Auto or Manual Hold
- •Internal Speaker, Audio Earphone/Headphone Jack
- •Built-in PC Interface, PC Connection Cable and Download Software included
- •Relative ten segment Signal Strength Bargraph
- •Optimum Maximized Sensitivity for increased nearfield distance reception
- •Tape Control Output with Tape Recorder Pause control relay and DTMF Encoder for audio data recording
- •High speed FM Communications Nearfield Receiver, sweeps 30MHz - 2GHz in less than 1 second
- •Two line LCD displays Frequency and either CTCSS, DCS, DTMF, Deviation or Signal Strength
- •NMEA-0183 GPS Interface provides tagging data with location for mapping applications
- •Frequency Recording Memory Register logs 500 frequencies with Time, Date, Number of Hits and Latitude/Longitude. *(Latitude & Longitude coordinates are only displayed in memory when used with GPS)*
- •Real-Time Clock/Calendar with lithium battery back-up
- •Built-in Rapid Charge NiCad Batteries with 5 hour discharge time and Power Supply included
- •Numerical Deviation Display with 1-10kHz and 10-100kHz ranges
- •Telescoping Whip full range Antenna included

Introductory Price $899

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* *Contact Optoelectronics for mapping software available*

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